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Technology Integration and Novice Teachers: Looking at Technology Use of Novice Teachers in the Context of Their First Year of Teaching

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Technology Integration and Novice Teachers: Looking at Technology Use of Novice Teachers in the Context of Their First Year of Teaching

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

August, 2006

Technology Integration and Novice Teachers: Looking at Technology Use of Novice Teachers in the Context of Their First Year of Teaching

Publication No._____

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The University of Texas at Austin, 2006

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Abstract: The aim of this study was to examine first year teachers' experiences incorporating instructional technology into their teaching through the lens of Technology-Pedagogical Content Knowledge. Technology-Pedagogical Content Knowledge is a fairly new concept drawn from the concept of Pedagogical Content Knowledge, originating with Shulman. Participating teachers were graduates of a Southwestern University's College of Education laptop initiative that required all College of Education students to purchase a laptop. The laptop was used throughout their pre-service teaching course work. The first graduating cohort of this initiative was surveyed during their first full year of teaching. Ten of those surveyed then participated in interviews and

journal writing related to their technology integration experiences. Results indicated that for the most part these new teachers are not facing access and support related barriers to technology use, though time constraints are still an issue. Results also indicated that the teachers are using technology in their instructional activities, and are continuing to grow in their technology integration skills. The basis in technology use from their College of Education combined with the technology-supportive school atmosphere in which they teach appears to be an environment that is fostering teachers who are willing to experiment with technology integration and are planning how to integrate it more in the coming school year. Their understanding of the connections between technology, content and pedagogy, their t-PCK, are developing and transforming. Impact on the field includes a greater understanding of how teachers come to design lessons for technology integration as well as a greater understanding of how graduates from teacher preparation programs with an emphasis on technology integration are able to apply their skills upon entering the teaching field.

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Chapter 1: Introduction

The machine does not isolate man from the great problems of nature but plunges him more deeply into them.

-Antoine de Saint-Exupéry

Education, work, love, friends, and colleagues—the above quote from Antoine de Saint-Exupéry brings to mind that an elementary school in many ways embodies all of these facets of life. Beginning teachers find themselves taking what they have learned in their College of Education and bringing it to a new and qualitatively different setting, where they are to work, make friends, support colleagues, love their students, and continue to learn-- in other words partake in all of the great problems of nature. On top of this teachers are expected to integrate technology into this very human web of interactions, a task potentially more problematic than anything they have encountered in their teacher preparation, yet eminently vital for the success of their students in the current knowledge-based economy.

This study examined the technology integration experiences of new teachers graduated from a college of education with a laptop initiative program. Teachers were asked to report their school environment, social environment, and their teaching in regards to technology use. Evaluated through the framework of technology-pedagogical content knowledge this study strived to understand how beginning teachers marry content, pedagogy and technology and how they then implement that marriage into instructional practice. The following are the major questions and sub-questions addressed in the study:

1. How do beginning teachers who have been in a ubiquitous computing environment perceive of technology in their teaching in elementary school classrooms?

- How do the teachers define "technology"
- What are the teachers' perceptions of their uses of technology in the classroom?
- What type of access to technology do the teachers perceive to be available for their instructional use?
- How do these teachers perceive their technology role in the school?
- What resources do the teachers perceive are available when they need help with technology in their classrooms?
- How do the teachers perceive the school culture's openness to technology integration ideas and activities?
- How prepared do the teachers feel their technology-rich College of Education program made them for integrating technology in their classrooms?

2. How do beginning teachers who have been in a ubiquitous computing environment connect technology and teaching in elementary school classrooms?

- How do the teachers approach lesson design when technology is involved?
- What non-teaching activities do they partake in at the school that relate to technology in the school?

- What resources do they reach out to when they need help with technology in their classrooms?

TECHNOLOGY IN SCHOOLS

Examples of technology initiatives providing computing devices for every student, called one-to-one programs, are quickly popping up across the country. In 2001 one school district in Virginia made technology a priority by providing every teacher and every middle and high school student in its district with a laptop (U.S. Department of Education, 2004). In 2002, the State of Maine began an initiative to give a laptop to every middle school student creating a ubiquitous computing environment for all 7th and 8th grade students (Initiative, 2005). In Tennessee and Arizona there are schools experimenting with foregoing textbooks in exchange for laptops and an electronic curriculum (eSchoolnews, 2005), and in Texas selected middle schools are experimenting with giving their students wireless computing devices (TxTIP, 2005). Such one-to-one technology initiatives are becoming less and less uncommon. Perhaps most telling about the exponential growth in numbers and investment in computer technologies in schools is the shift in statistical reporting from "student use of computers" in 1984 (OERI, 1998), to "student use of computers broken down by sex and grade level" in 1993 (OERI, 1998), to "schools with internet access"' in 1994 (NCES, 2001), onto "number of schools with laptops and wireless networks" in 2003 (MDR, 2003). The massive and rapid infusion of technology into schools that has developed since 1984 took school leaders a bit by surprise and before long it was clear that educators, for the most part, did not have the requisite skills to apply technology to its full potential. As access to technology increases

at lightening speed it presses to the forefront the urgent call for teachers to be well prepared in integrating such technologies with their students' instruction.

Such a rapid change in educational settings and goals required a rapid change in teachers and teaching, but a change in what area? Surely technology skills needed to be updated, but does skill translate to teaching ability? According to Shulman's construct of Pedagogical Content Knowledge, while knowledge of learners, knowledge of how to structure activities for those learners, and knowledge of the content being taught are all vital elements of a teacher's knowledge, there is something else that teachers draw upon for effective teaching: pedagogical content knowledge. Where those knowledge domains intersect is pedagogical content knowledge. Pedagogical content knowledge, or PCK, is described by Shulman as the professional knowledge of teachers that crosses pedagogy, knowledge and content knowledge (Shulman, 1987).

TECHNOLOGY-PEDAGOGICAL CONTENT KNOWLEDGE

PCK (Shulman, 1986), was developed as part of an exploration of teacher content knowledge originated to give more professional credibility to the work of teachers (Carlsen, 1999). Shulman divided content knowledge into three sub-areas of: subject matter content knowledge, pedagogical content knowledge, and curricular knowledge. PCK was later moved by Shulman out from under content knowledge to being a type of teacher knowledge by itself (Gess-Newsome, 1999). Over the last twenty years of research there have developed various ways of conceptualizing PCK, some incorporating certain aspects of teaching, and others excluding them. Several researchers since Shulman have incorporated curriculum and media into PCK, perceiving an understanding

of the curriculum and media available for instruction in a particular content area as essential aspects of a teacher's PCK (Segall, 2004).

A teacher's pedagogical content knowledge will not have much use without his or her knowledge and understanding of the materials available with which to teach the content or to apply the pedagogy. In the current climate of technology in schools this will often be instructional technology. In this study instructional technology refers to the more internationally used term of "information and communication technologies". Technology-pedagogical content knowledge, or t-PCK, is the integration of subject–matter knowledge, knowledge of how technology can benefit learning, and knowledge of pedagogy (M. L. Niess, 2005); it is "an overarching conception of their subject-matter with regard to technology and what it means to teach with technology" (M. L. Niess, 2005, p. 510).

As t-PCK comes out of what the teachers know, the learners with whom the teachers are working, and the materials with which the teachers work, this study examined the teachers' perceptions of their CoE experience as well as their current experience with technology as first year teachers teaching in an elementary school classroom.

HISTORY

Beginning in 1998, the National Educational Technology Standards Project (NETS) progressively developed guidelines and standards for students (published in 1998), teachers (published in 2000), and administrators (published in 2001) (ISTE, 2005). In addition to technology standards the NETS project has developed a set of essential conditions that must be present in a College of Education (CoE) in order for students to

learn how to use technology in creative and effective ways in instructional settings (ISTE, 2004a). As described by the ISTE NETS website these essential conditions include a Shared Vision, Access to Technology, Skilled Educators, Professional Development, Technical Assistance, Content Standards and Curriculum Resources, Student-Centered Teaching, Assessment, Community Support, and Support Policies. Other research has worked to identify elements that exist as barriers to technology use, finding, as ISTE did, that a lack of computers and a lack of knowledge among teachers, were the two greatest obstacles (Pelgrum, 2001). In addition, other elements cited in the research as vital to effective classroom technology integration include direct access to an individual who will assist the teacher in bringing the curriculum and the technology together (Pelgrum & Plomp, 1993), and the teacher's social understanding of technology relationships in his or her school (Zhao, Pugh, Sheldon, & Byers, 2002). The next question was how to ensure that these essential elements were a part of the instructional realm of the teacher.

According to Fullan (1993, p. 22), to accomplish educational goals "you cannot mandate what matters, because what really matters for complex goals of change are skills, creative thinking, and committed action…you cannot make people change...you cannot force them to think differently or compel them to develop new skills". In the scope of the change to technology in the classrooms CoEs soon understood that a change in the relationship between pedagogy and content through the introduction of technology meant that they must play a key role in preparing pre-service teachers to use technology in instruction. CoEs looked for ways to address these issues early in the development of a teacher's understanding of teaching and of the teacher's t-PCK development through the college of education course work. Historically there have been two general

approaches to preparing pre-service teachers to integrate technology in the classroom curriculum. The first was to offer a separate technology course, one where the mechanics of the technology can be focused upon, and general integration principles can be discussed. This course was often placed early in the student teacher's coursework, before teacher methods classes. The second was to integrate technology training throughout the methods coursework, mimicking the way in which their own technology use might one day be integrated throughout all of the areas of their own classroom instruction. In earlier examples the single course approach proved most popular. The single course was seen as a way to introduce the many possibilities that computers had for education, and to lessen computer anxiety (Novak & Berger, 1991). However, even in the early 1990s, it was understood that the single course method was a temporary fix, the goal being to reach a point of faculty confidence and skill with computer technologies so that the technology could be integrated directly into the teacher education courses (Hargrave & Hsus, 2000).

While there exists a large amount of research from the year 2000 and earlier showing that teachers favor computers for email and lesson plan writing over curriculum integration, one might expect that in subsequent years teachers' t-PCK would have had the opportunity to develop. In turn one would expect that how teachers use technology would have shifted towards instruction. However, even in recent studies it seems that teachers generally use computers for email (Russell, Bebell, O'Dwyer, & O'Connor, 2003), word processing (Barron, Kemker, Harmes, & Kalaydjian, 2003), and information gathering (Becker, 1994; Carlson, 2002) rather than for learning activities that require student use of technology. This research led the CoEs to ask themselves again what type of approach was best suited not only to preparing teachers to use technology in their

classrooms, but also to helping student-teachers understand the most current methods and practices for integrating technology with the content and their pedagogical knowledge; and which type of program would most encourage the graduating teachers to transfer the technology skills and use them in their instructional practice? One problem that was identified with the approach taken by the CoEs was that access to technology, as described earlier, is a prerequisite to learning how to use technology, yet at the time most CoEs had computer labs, providing only limited access to the student teachers. Computers in a lab could not go into CoE courses, the practice school site placements, or home with student teachers.

To reach a level of comfort with, understanding of, and knowledge about computer technologies, a level where curriculum integration can occur, requires time to practice technology in a comfortable, safe learning arena (Savenye, Davidson, & Orr, 1992; Wiebe, 1995). While a lab can be a safe and comfortable space, the student teacher's first classroom setting is often more challenging. Authentic practice in classroom settings is, after all, the purpose of student teaching. Requiring and facilitating the use of technology in field experiences is influential on the teacher's use of technology in those experiences (Dexter & Riedel, 2003), experiences which should then transfer to his or her first classroom teaching job. In a one-to-one technology program through modeling and coaching the pre-service teacher experiences what a technology-integrated classroom could be like. Developing teaching practice such as technology integration requires learning experiences that go beyond the reading and test taking commonly found in undergraduate courses (Darling-Hammond, 1998). The core of constructivist learning theory is that the learner constructs his or her own meaning (Schallert & Martin, 2003)

and in this model of teacher preparation the pre-service teacher begins to construct an understanding of teaching. It would be the hope and plan of a CoE supporting a ubiquitous computing environment that the student teacher will develop into a teacher who uses technology that the teacher has seen modeled, and will construct an understanding of technology as an integrated, ubiquitous part of education. Out of the early experiments described above arose an interest in developing one-on-one programs where both the student teachers and the faculty are given laptops to provide ubiquitous access to the technology. In this setting the known barriers to technology integration under control of a CoE can most strongly be addressed (Greaves, 2000).

THE CONTEXT OF THIS STUDY

Niess, in an article on developing technology-PCK in pre-service teachers, wrote that "for technology to become an integral component or tool for learning, science and mathematics pre-service teachers must also develop an overarching conception of their subject matter with respect to technology and what it means to teach with technology—a technology PCK (TPCK)" (M. L. Niess, 2005, p. 510). The college of education technology initiative from which teachers in this study graduated was developed partly in response to a state level requirement that teachers be proficient in the use of technology (UT_CoE, 2005), with the goal of creating teachers who have technology proficiency and who will integrate technology into their classrooms as a natural part of teaching. In 2002, a College of Education inaugurated the Laptop Initiative for Future Educators (LIFE) with the main objective described as "developing teachers who can use technology tools to improve or even transform the learning process"(UT_CoE, 2005). This program was designed not only to prepare student teachers to use technology but to do so in such a

way as to try to provide the known essential elements to successful technology programs. The program is otherwise similar to other teacher preparation programs with a course of study giving a foundation in educational psychology, child development and learning theory and then followed up by courses in pedagogical methodology and content knowledge.

The purpose of this CoE program is to develop teachers well-prepared in technology, in their content areas, and in pedagogy. A second purpose, that of the laptop initiative within the CoE program, is that the teachers will integrate technology into their classrooms in an instructionally meaningful way. This second purpose is a principal goal in schools today, though at this point it is still not know if it is indeed the outcome of the laptop initiative. How these beginning teachers, prepared in technology integration practices and ideas, negotiate their technology preparation with the demands and realities of the first year of teaching is an area in need of closer examination. Through the framework of Technology-PCK this study explored how beginning elementary teachers, graduated from a college of education with a one-to-one technology initiative, brought technology to their first year of teaching.

While examining the technology related first-year experiences of new teachers graduated from this laptop initiative, I am also, by nature of the questions, evaluating the initiative. As stated above, the laptop initiative exists to develop "teachers who can use technology tools to improve or even transform the learning process"(UT_CoE, 2005). If the teachers turn out to not be able to use technology in their teaching then the initiative has not been successful.

This study therefore takes on a dual purpose. The first is to examine the technology perceptions and experiences of this group of new teachers, a group prepared in a CoE program with an initiative focused upon the development of the teacher's technology skills. Do they use technology, if so how, if not, why not? The second purpose, as I examine whether these teachers are using technology, is to examine whether or not a one-to-one technology initiative, such as this, does indeed prepare the new teachers to use technology in their instructional practice.

As researchers have examined the technology integration experiences of new teachers they have turned to the literature on teacher change. Research in teacher change traditionally examined the change, or more commonly the lack of change, demonstrated by teachers through the point of view of the mandator of the change. Recently a shift in the research has been noted and the focus on educational change has begun to involve the teachers' perspectives, often going so far as to say that teachers are always changing (Richardson & Placier, 2001). These voluntary changes come about as the teacher is in contact with students, other teachers, administrators, and so on, in other words each of the elements of the profession. Research on teacher change has identified stages of development, starting from the beginning teacher period going through to master teacher period, which are useful in demonstrating that the beginning teacher has a different approach, purpose and pedagogical experience than the more experienced teachers (Bullough & Baughman, 1997; F. Fuller & Bown, 1988; Levin, 2003). Everyday teachers are constantly changing as they develop everyday their understandings of pedagogy, of technology in education, and of the relationship how content, technology and pedagogy fit together within the context of their school and students. But the

beginning teachers in this study are also doing this constant change of their technology pedagogical and content knowledge thinking within the greater scope of being a beginning teacher and all of the demands and situations that being in this stage of their professional development requires.

Despite, and perhaps as a result of, the complexities of separating the effects of technology from other factors that influence teaching and learning (Noeth & Volkov, 2004), it seems that there is limited research examining the experiences of beginning teachers in relation to their technology use. Teachers are faced with professional expectations that demand technology integration. Understanding what influences the use of technology in instruction when teachers have had a technology-rich COE experience will not only add to the current literature on technology integration and technology-pedagogical content knowledge, but also will inform the educational community, including Colleges of Education, as to the effectiveness and reach of some of our most current, vital and heavily funded practices in preparing future teachers to integrate technology in elementary school classrooms. That knowledge will make it possible for educational designers and policy makers to encourage the kinds of technology programs most likely to support both teacher and student success.

Chapter 2: Review of the Literature

The customs and fashions of men change like leaves on the bough, some of which go and others come.

--Dante Alighieri

The above quote seems a fitting way to begin a review of the influx of technology in education and the necessary changes it has brought in teacher education programs. In fact, to carry the metaphor one step farther, I could say that while much has come and gone over the years in attempting to meet the demands of this particular educational reform, teacher education programs, and k-12 schools have become stronger and renewed from the changes like trees do after two decades of growth, feeding and some well planned pruning.

TECHNOLOGY PEDAGOGICAL CONTENT KNOWLEDGE

In the 1980s while examining teacher knowledge through "philosophy, psychology and a growing body of casework" (Shulman, 1987, p1), Shulman divided teacher's professional content knowledge into three distinct categories: subject matter content knowledge, pedagogical content knowledge and curricular knowledge (Shulman, 1986). For Shulman content knowledge included being able to discern "why a given topic is particularly central to a discipline whereas another may be somewhat peripheral"(p9). Shulman described curricular knowledge as the "full range of programs" and "instructional materials" which are "designed for the teaching of particular subjects

and topics at a given level" (p 10). Pedagogical content knowledge (PCK) was the understanding about the subject and learners that the teacher has which "goes beyond knowledge of the subject matter per se to the dimension of subject matter knowledge for teaching" (p9). Shulman eventually moved PCK from being a subsection of content knowledge to being a type of teacher knowledge by itself (Gess-Newsome, 1999).

While the concept of PCK has over the last twenty years become well-accepted (Munby, Russell, & Martin, 2001) there have developed various way of conceptualizing it. Shulman's conceptualization of PCK incorporated a teacher's knowledge of student learning and conceptions along with best representations and strategies for teaching various topics to various learners. For Shulman the category "curriculum and media" was a separate category in a teacher's teaching knowledge. In a paper presented to the National Association for Research in Science Teaching, Lee et al made a comparison of the various conceptualizations of PCK (Lee, Brown, Puthoff, Fletcher, & Luft, 2005). They identified eight types of teacher knowledge referred to by different researchers. Of those eight Shulman only incorporated two into his concept of PCK. The other six fall under other categories. Since Shulman, researchers, such as Grossman (Grossman, 1989), have incorporated curriculum and media into PCK, perceiving a knowledge of the available curriculum and media as essential aspects of a teacher's PCK (Segall, 2004). Grossman explained this when writing that "good teachers not only know their context but they know things about their context that make effective instruction possible" (1989, p. 24). Grossman portrayed PCK as having four parts. These four parts can be understood as: 1) what the teacher understands is important to learn about the content at a given grade level, 2) what the teacher understands students of a given grade understand

and typically misunderstand on a topic, 3) the teacher's understanding of curriculum and curricular materials as well as the scope and sequence of the curricula, and, 4) the teacher's understanding of strategies, explanations and representations for topics within the content (Borko & Putnam, 1996; Grossman, 1990). That a teacher's understanding of the available media and the educational advantages of using various media is an integral past of his or her Pedagogical Content Knowledge is a central assumption of this study.

In addition to excluding media, the traditional Shulman approach to PCK is domain specific. Technology, however, is not a domain, but rather it is used across many domains. An article by Margerum-Leys and Marx addressed the same issue. They stated that "effective teaching with technology requires knowledge that can be described independently of the domains…a teacher needs to know things about technology use that are not technology content knowledge and that are not general pedagogical knowledge" (J. Margerum-Leys & R. W. Marx, 2004, p. 433).

For the purposes of this study, the domain specific concept of PCK is expanded to a concept that encompasses how teachers use instructional technologies effectively in instruction, technology-pedagogical content knowledge (t-PCK). T-PCK is, therefore, the intersection in a teacher's practice of: instructional technologies, knowledge of how instructional technology can benefit learning, subject–matter knowledge, and knowledge of pedagogy. It is "an overarching conception of (the teacher's) subject-matter with regard to technology and what it means to teach with technology" (M. L. Niess, 2005, p. 510).

Because it is a part of a teacher's professional knowledge, the general population would not be expected to have t-PCK; therefore it must be developed somehow.

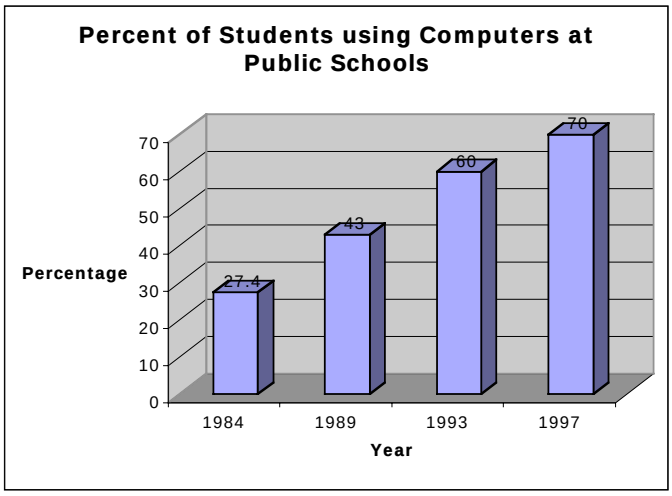
According to Burke and Putnam in a 1996 review of PCK literature, there is the sense from the literature that "teachers can, at least in some cases, increase their pedagogical content knowledge through participation in teacher preparation programs" (p. 693). Shulman (1987) identified four sources of PCK. These areas were: "1) scholarship in content disciplines, 2) the materials and settings of the institutionalized educational process (for example, curricula, textbooks, school organizations and finance, and the structure of the teaching profession), 3) research on schooling, social organizations, human learning, teaching and development, and the other social and cultural phenomena that effect what teachers do, and 4) the wisdom of practice itself" (p 8). Grossman (Grossman, 1990) also identified four sources of teachers' PCK: 1) how they themselves were taught 2) their domain knowledge 3) their professional education and 4) their classroom teaching experiences. In van Driel, Beijaard and Verloop's study of the practical knowledge of science teachers, the central factor in the development of PCK is the last of Grossman's list: teaching experience (Van Driel, Beijaard, & Verloop, 2001). When combined these various conceptions of the development of PCK encompass what teachers know about teaching and learning and the environment where they teach. This study examined how new elementary teachers in a variety of schools and grade levels perceived of technology use in their instruction. It explored their perceptions the environment in which they taught and their CoE experience through a framework of technology-pedagogical content knowledge.

SCHOOLS

In a 2003 report based on national census data of technology in schools it was reported that more than 37 % of public elementary schools had not just computers, but

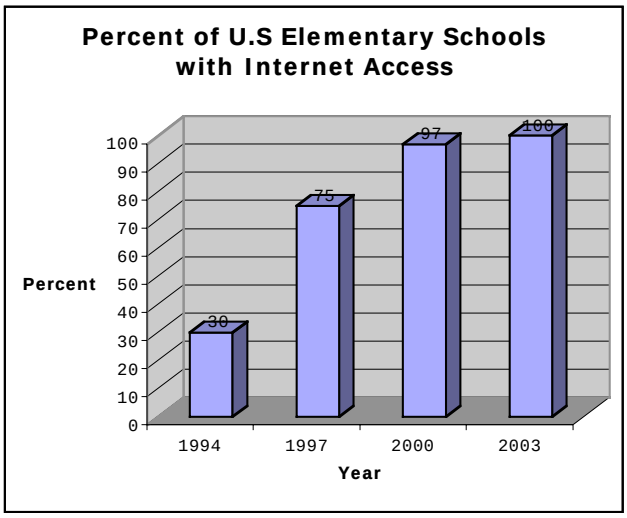
laptop computers for student use (MDR, 2003). This same report informs that 23% of public elementary schools have wireless networks and gives an estimate of more than five million computers out there in public elementary schools. Then it should come as no surprise that in a 2001 report by the National Telecommunications and Information Administration, a segment of the Department of Commerce whose main purpose is to advise the President of the United States on telecommunications issues, it was reported that almost 90% of all school-aged children use computers, and that 84% of 5-9 year olds use computers at home or at school (NTIA, 2002). In fact 99% of schools are reported to have access to the Internet, a tremendous growth up from 35% in 1994 (Kleiner & Farris, 2002). Also in 1993 the Office of Educational Research and Improvement of the Department of Education reported 59% of students using computers in school. This was a significant increase from the lower 1984 report of 27% (OERI, 1998). The charts below demonstrate graphically the amazing leap in computer technologies used in U.S. public education during these last 20 years.

Figure 1: Percent of Students Using Computers at Public Schools



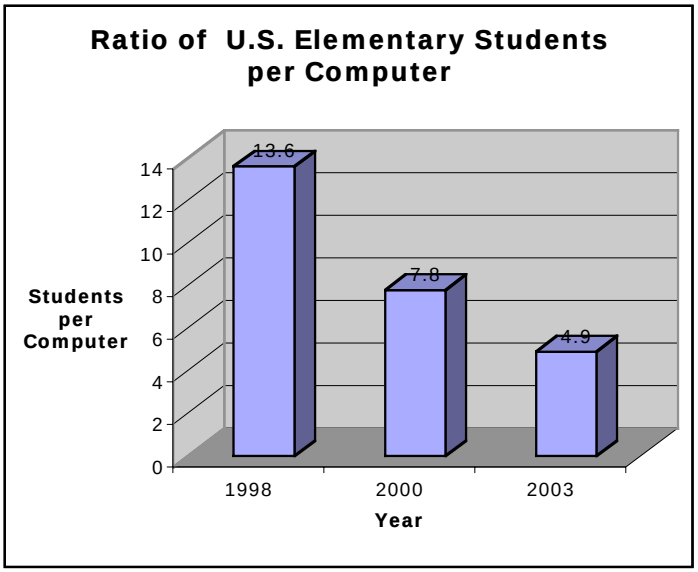
Data used in the above chart comes from a 1998 report (OERI, 1998). Subsequent studies no longer asked this particular question. Questions that assume computer use, such as percentage of Internet access and wireless connections, replaced it.

Figure 2: Percent of U.S. Elementary Schools with Internet Access



The data in the figure above comes from the 2005 version of the report providing the data in the previous chart (Parsad & Jones, 2005). The same report also indicates that 11% of instructional rooms in U.S. public elementary schools have wireless Internet connections.

Figure 3: Ratio of U.S. Elementary Students per Computer



This final figure demonstrates that not only has the influx of computers into our schools brought more elementary students into contact with computer technologies and the information super highway but also that there are more computers available for each student's use (Parsad & Jones, 2005).

Despite the immense influx of computer technologies into schools described through the preceding government census data, not all educators support the widespread infusion of technology into the educational landscape. There have been various concerns raised on educational value and digital equity issues in regards to computers in schools. Arguing that computers in schools will not equate to social progress but instead will make more profound the gaps between the haves and the have-nots in this country, Michael Apple, in 1997, urged Americans not to delve into technology in our schools without fully considering the long-term outcomes economically and socially for our

students. Apple wrote that the majority of the jobs related to technology in this country are low paying, unskilled and monotonous—perhaps not what is wanted for the future of the nation's children. McCurry (2000) echoes some of these same concerns adding that the pressing issue facing our country, and therefore our schools, is that of a diverse society moving closer together, and argues that technology in schools can not address issues of cultural diversity if technology is continually used for consumption rather than production. Appealing along an economic line of reasoning Cuban (1998) wrote that educators need to first ask what are their learning goals and then ask if they are able to meet those goals without the added expenditures that computers bring.

In contrast, other commentators and researchers see benefits to educational attainment and/or socio/cultural benefits. The Center for Applied Special Technology (CAST) conducted a study in seven major U.S. cities over the 1995-1996 school year in which the effects of online use on student learning were investigated using experimental and control group classrooms teaching a unit on Civil Rights (CAST, 1996). The researchers found that students who went online learned more on the topic than those who did not, had more impressive communication and presentation of ideas, and created projects which were rated as higher overall. The CAST study serves as an early suggestion that technology in schools does indeed have the potential to not only support but also to increase student learning. Haddad (2003) makes the claim that technologies well utilized in classrooms have the potential to enhance the learning process by pairing principles for effective learning garnered from cognitive psychology and brain research with classroom uses for technology that would enhance learning in each area. Traditional student assessments are also beginning to support the claim that well-integrated technology can boost student learning. Results from a statewide achievement test given

since the start of Michigan's Freedom to Learn Initiative, a one-to-one wireless laptop initiative providing a ubiquitous computing environment for middle school students, have shown increases in some schools of as much as 30% in seventh and eighth grader's scores ("Mich. laptop program shows early success", 2005). On a cultural end, in his book *Visual Pedagogy*, Goldfarb (2002) shows through previously successful examples the ways in which technology has been used as a tool of empowerment in the hands of underrepresented populations. Students in Goldfarb's book take technology and use it to produce stories of their own inner city lives, shedding off the imposed stereotypes for self-created statements of cultural empowerment.

Fitzsimons (2000), responding to the accusation that globalization brings domination and homogeneity to all social areas including education, points out that globalization also brings electronic information technologies to education and for the first time allows various people's thoughts and ideas to be instantly globally visible-a stimulus for fostering cultural difference. From an economic perspective the Organization for Economic Cooperation and Development, an international organization chartered to promote economic development in the world stage, lays out in a 2001 report the need for developing and prosperous countries alike to embrace Internet and communication technologies in schools. From future national economic needs to the improvement of the diffusion and development of pedagogical methodologies, ICTs are described less as an option and more as an imperative (OECD, 2001). On the part of both sides of this debate a leading concern is that educators be equipped with an understanding that bridges pedagogical knowledge and the unavoidable technical knowledge of how to exercise the integration of computer technologies into their classroom instruction. As the infusion of computers and Internet has become more ubiquitous, not only have the

numbers of computers increased, but the expectations on teachers, as well as the level of sophistication of the technology, have also grown. It is apparent that where once the focus in data collection was on percent of students using computers in schools, the newest focus in classroom technology integration is on one-to-one learning environments, where every student has constant access to a computing device, often with access to the Internet through wireless Internet connectivity. That teachers are prepared to use technology in an educationally supportive manner becomes more imperative when the technology is a constant and unavoidable part of the school day.

ONE-TO-ONE COMPUTING ENVIRONMENTS

One-to-one computing environments are situations in which each student has a laptop or palm-held computer that is the student's to use both at school and at home, equipped with wireless connectivity provided in the school building, allowing for anytime/anywhere Internet access (Greaves, 2000). At the University level in the United States and Canada there are roughly 100 campuses with a universal laptop program in which every student and faculty member has a laptop and access to the Internet, and another 50 campuses where individual schools within the campuses have adopted such laptop initiatives (Brown & Petitto, 2003). The introduction of one-to-one programs, however, has not been solely the realm of higher education or even high school. Several middle and elementary schools in the United States have implemented one-to-one programs. Maine, Virginia, Texas, New Hampshire, New Mexico, Arizona, Connecticut and Michigan all provide examples of creating one-to-one computing environments in selected grades of their k-12 schools. Some of these examples are at the district level, such as a district in Virginia where every district teacher and every middle and high school student were provided a laptop computer (OET, 2004), or in Vail, Arizona where

the high school is putting textbook money towards laptop computers to create an all wireless, all digital high school (eSchoolnews, 2005). Some of the examples also are at the State level, such as Maine's (Initiative, 2005), New Mexico's (Shippley, 2004), and Michigan's (Murray, 2003) initiatives, all focusing on providing computing devices to all 6th and/or 7th graders. Other programs are in a pilot stage, such as the Texas program providing hand held computing devices to each student and teacher in several selected Texas middle schools (TxTIP, 2005), therefore testing the waters to find the strengths and limitations of such initiatives. In other school districts where the funding just isn't there for one-to-one programs, the districts are nonetheless maximizing student contact with computers during instructional time. De Soto, Kansas' attempt to provide laptops to all fourth and fifth graders (Stites, 2005), and Lemon Grove California's one-to-two student to computer ratio and community wide Internet access initiative (LemonLink, 2004) are examples of schools maximizing the technology possibilities within their means. In Tennessee, after economics forced textbook companies to stop producing Tennessee state history texts, teachers turned to Internet sources for covering the state required curriculum (eSchoolnews, 2005). These examples drawn from across the country are not anomalies, and it seems that almost every week the news of a new school, district or state expanding their curriculum to include some version of a high computer/student ratio technology program. Drawing from the reported experiences of 13 U.S. and international universities with one-to-one ubiquitous computing programs Brown and Petitto (2003) describe the greatest benefit of one-to-one computing environments to be the way in which communication is supported and developed. From conclusions based upon their experiences as consultants and their research with universities and through the integration of a one-to-one program, both teaching and learning become more interactive

and more collaborative. However, one of the most vital factors leading to a successful program is that faculty are dedicated to the program (Brown and Petitto, 2003). In a year long study looking at how the massive influx of technology was effecting secondary students, researchers found that one reason why teachers do not always use available technology was that teachers saw technology as a secondary rather than as a primary goal for education (Peck, Cuban, & Kirkpatrick, 2002b). In this study the researchers report that technology had become a "small and largely peripheral element" in high school (Peck, Cuban, & Kirkpatrick, 2002b). If technology is being placed in schools at the rate at which the census data claims, and if studies such as those above are describing the typical in schools and teachers, then there exists a huge disparity between schools where technology is used and in some cases depended upon, and others where it is only a small step up from collecting dust. In many places teachers could be a large part of that difference.

TECHNOLOGY INTEGRATION FACILITATORS AND BARRIERS

In 1995 the rapid infusion of technology into schools that has developed since 1984 prompted the Senate Committee on Labor and Human Resources to examine the connection between teachers, technology and learning. The Office of Technology Assessment (OTA) conducted a review of studies focusing on technology in education. This report found that there was a need for the Federal government to step in and help in the preparation of future teachers to ensure the most effective use of computer technologies in schools. The report also noted that it was vital to the success of any endeavor that k-12 schools and colleges of education be linked in their goals and projects. The report served as the basis for two initiatives that would prove crucial in the development of successful technology integration understandings and experiences: the

PT3 grant initiative sponsored by the Federal government and the development of standards for teacher technology education by ISTE.

ISTE first published its technology standards for teachers, developed through their National Educational Standards Project (NETS), in 2000. However, the project began in 1998 with standards for students (ISTE, 2005). The standards for teachers are intended to be standards they should have mastered by the time they complete their college of education program, and were developed to fit directly with the standards for students. Developed during a time when less than half of the CoEs in the U.S. were requiring their students to create and teach lessons using technology (CEO, 2000), the standards "define the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings" giving the CoEs direction for their programs (ISTE, 2005). Research since the development of the 2000 ISTE standards pointed out that there are certain items that arise again and again in the research literature as barriers to the integration of technology in classrooms. These issues too must be addressed if teachers can implement their preparation and standard skills in their classrooms.

The first barrier that appears consistently in the literature is perhaps the too obvious one: professional development. Sam Carlson, the executive director of World Links, a global non-profit organization whose mission, according to its website, is "to improve educational outcomes… through the use of information technology", writes, "teacher training in the use and application of technology is the key determining factor for improved student performance"(p 7). This is followed by the suggestion that eighty hours of professional development are required before teachers are ready even to begin to integrate technology in their classrooms, an amount that most teachers, according to Carlson, do not receive (Carlson, 2002). Becker (1994) conducted an early study on what factors make a teacher an "exemplary" computer-using teacher. Forty-five teachers

were identified from a survey of over 500 teachers as “exemplary” computer using and subsequently included in a case study in order to find out what made them, as five percent of the original sample population, more successful at using computers than the other 95%. Four characteristics of their teaching environment were identified, including technology related staff development activities.

That professional development activities are vital comes with little surprise, as teachers are, after all, the final deciding factor of what happens in a classroom. While professional development is undeniably an important element of successful technology integration, it is by itself not enough for technology integration to succeed; access to functioning technology and applicable software must be available to the teachers or the training will have no possibility of being applied (Resta, 2002).

Access to technology and professional development are, by and large, the most commonly cited barriers to technology integration. Although these common barriers are some of the most predictable, they are often overlooked and are not alone. The research cited other elements as invaluable components of successful technology integration. Direct access to an individual who will assist the teacher in bringing the curriculum and the technology together was found to be a necessary element by a 1993 international survey that included the United States and 19 other countries (Pelgrum & Plomp, 1993). In this survey Pelgrum and Plomp found that along with technology skills and environment, “internal innovation assistance”, depicted as a specialist available at the school site for help in integrating technology, was one of the most influential factors explaining why some teachers integrate computers more than others.

Another less widely cited barrier to technology integration are the various barriers related to the social environment and understanding of the teacher in the school site. In

Zhao's year long case studies of ten k-12 teachers (Zhao, Pugh, Sheldon, & Byers, 2002), the importance of the teacher's social understanding of the technology relationships in his or her school is stressed. Zhao's social understanding is described as a teacher's grasp of the organizational culture of the technology related elements of the school, be they individuals, departments or resources, and how to maneuver through them successfully. For Friedman (2002), described in more detail later in this chapter, the social aspect to successful technology use lies in understanding the subtle mores of a wired society such as online etiquette. Other barriers related to social relationships can be found in Peck et al.'s study of two northern California high schools. The study offers a complex explanation for the lack of technology integration including factors such as the departmental structure of the high schools hampering communication between teachers and teacher time constraints (Peck, Cuban, & Kirkpatrick, 2002a, 2002b). Vannatta and Fordham (2004) conducted a survey to identify teacher dispositions that might be predictors of technology use. They found that teacher willingness to commit time outside of school and teacher openness to change were factors that worked together with the amount of technology training the teacher had to predict frequency of classroom technology use. Along with pedagogically related technology skills and access to working technology, the myriad inter-related social factors surrounding the school professional environment appear to be important ingredients in the ability of a teacher to successfully integrate technology.

As the above-described research began to emerge, ISTE created a set of essential elements that research pointed to as necessary if the teacher was to master technology integration. ISTE's list became a standard reference in developing technology progress in schools, referred to or drawn upon by almost every state in the country (ISTE, 2004b) .

ISTE's necessary elements include: a Shared Technology Vision, Access to Technology, Skilled Educators, Continuing Professional Development, Technical Assistance, Content Standards and Curriculum Resources, Student-centered Teaching, Assessment, Community Support, and Support Policies. As the list is designed to be applicable to beginning teacher preparation courses, student teaching placements, and first year teachers ISTE has also developed guidelines of what the essential elements look like in each of those settings (ISTE, 2000). Below are the essential conditions from this chart for the teacher's first year in the classroom:

Table 1: ISTE Essential Elements and how they look in practice

SHARED VISION—There is proactive leadership and administrative support from the entire system.	Schools, districts, and universities share a vision for supporting new teachers in their use of technology in the classroom.
ACCESS—Educators have access to current technologies, software, and telecommunications networks.	Access to current technologies, software, and telecommunications networks is provided for new teachers for classroom and professional use, including access beyond the school day.
SKILLED EDUCATORS—Educators are skilled in the use of technology for learning.	Peers and administrators are skilled users of technology for teaching and school management.
PROFESSIONAL DEVELOPMENT—Educators have consistent access to professional development in support of technology use in teaching and learning.	Faculty has continuous access to a variety of professional development opportunities in several delivery modes, with time to take advantage of the offerings.
TECHNICAL ASSISTANCE—Educators have technical assistance for maintaining and using the technology.	Technical assistance for faculty and staff is timely, onsite, and includes mentoring to enhance skills in managing classroom software and hardware resources.
CONTENT STANDARDS AND CURRICULUM RESOURCES—Educators are knowledgeable in their subject matter and current in the content standards and teaching	The school district provides professional development opportunities related to local policies and content standards and the technology-based resources to support the new teacher's efforts to address those standards.
STUDENT-CENTERED TEACHING—Teaching in all settings encompasses student-centered approaches to learning.	Faculty routinely use student-centered approaches to learning to facilitate student use of technology.
ASSESSMENT—There is continuous assessment of the effectiveness of technology for learning.	The district and school site support the classroom teacher in the assessment of learning outcomes for technology-supported activities to inform planning, teaching, and further assessment.
COMMUNITY SUPPORT—The community and school partners provide expertise, support, and resources.	Schools provide beginning teachers with connections to the community and models of effective use of local and other resources.
SUPPORT POLICIES—School and university policies, financing, and reward structures are in place to support technology in learning.	School induction-year policies, budget allocations, and mentoring assignments support the first-year teacher's use of technology. Hiring practices include policies regarding technology skills of prospective hirees.

If the research findings mentioned above on barriers and facilitators to technology integration are added, eliminating those already explicitly included in ISTE's list, the following additions are made:

Table 2: Additional Elements Necessary for Technology Integration

Direct **access to an individual** who will assist the teacher in bringing the curriculum and the technology together (Pelgrum & Plomp, 1993) (Granger, Morbey, Lotherington, Owston, & Wideman, 2002) (Strudler, 1996)	The school provides a full time individual at the school who is available to help teachers with the more time consuming aspects of preparing technology-integrated lessons.
The teacher's **social understanding of technology relationships** in his or her school (Zhao, Pugh, Sheldon, & Byers, 2002) (Friedman, 2002).	The teacher is aware of the individuals in the school who will assist with access to technology
The departmental structure of high schools hampering **communication** between teachers (Peck, Cuban, & Kirkpatrick, 2002a, 2002b)	The schools provide interdepartmental technology communication forums (online or face-to-face) to help bridge the departmental divides.
Teacher **openness to change**	Teachers are willing to try new approaches to student learning, specifically integrating technology with curriculum.
Time constraints (Peck, Cuban, & Kirkpatrick, 2002a, 2002b) (Vannatta & Fordham, 2004)	Teachers have enough time in the school day to prepare and deliver technology rich lessons.

This is clear from these charts that the way to support technology integration is more than just instilling new teachers with positive technology attitudes and skills, but also that any effort must be, as the 1995 US Congress report suggested, a joint effort between CoEs and local school sites. Many of the factors listed above, such as supporting social relationships at the school, are out of the reach of the CoEs. Only a true partnership between both the CoEs and the local schools could make a leap in technology integration in schools.

Not long after its inception the ISTE NETS (National Educational Technology Standards) project linked with the other outgrowth from the US Congress' 1995 report creating a Department of Education grants project called Preparing Tomorrow's Teachers to Use Technology (PT3). Started in 1999, the PT3 grants project awarded over 337 million dollars to bridging the gap between the vast amounts of technology in the schools and the inadequate situation of teachers in using the technology (PT3, 2005). Grant topics covered many areas identified by the research on technology integration such as professional development, technology mentoring, and teacher certification policy. The grants were open to schools and CoEs, but in keeping with the spirit of a joint approach,

to “consortia of public and private institutions, including at least one institution of higher education, one state and local education agency, and one or more of the following: another institution of higher education that awards baccalaureate degrees and prepares teachers for their initial entry into teaching, a school or department of education at an institution of higher education, a school or college of arts and sciences or a professional association, foundation, museum, library, for-profit business, public or private nonprofit organization or other entity with the capacity to contribute to the technology-related reform of teacher preparation programs” (PT3, 2005). In the first year and a half of the grant program results began to come in that teachers coming out of programs funded by PT3 grants were found through observations by their CoE professors to be technology proficient (PT3, 2002). However, other research wasn’t always showing that there was a change in teacher technology practices.

While there is a large amount of research from the year 2000 and earlier showing that teachers favor computers for email and lesson plan writing over curriculum integration, one might expect that in the five years since the ISTE NETS for teachers were published and the PT3 grants had been developed, that this would have shifted. In a recent large-scale survey of computer use by teachers in Massachusetts, however, it was found that despite the strong push for instructional technology use, teachers generally used computers for communication (email) and lesson preparation (word processing) rather than for learning activities that require student use of technology (Russell, Bebell, O'Dwyer, & O'Connor, 2003). In another recent large-scale survey of public school teachers, while 50% of the responding teachers report using technology as an information gathering tool, it was the science and math teachers who were most likely to use computers as a research or problem-solving tool with their students (Barron, Kemker,

Harmes, & Kalaydjian, 2003) . The focus again would turn to the CoEs to reevaluate what was and was not working in preparing teachers for technology use.

PREPARING TEACHERS FOR TECHNOLOGY RICH LEARNING ENVIRONMENTS

There seemed to have been two general approaches taken by CoEs in preparing pre-service teachers to integrate technology in their classroom teaching. The first approach was to offer a separate technology course, one where the mechanics of the technology can be focused upon and where general integration principles can be discussed. The second approach was to integrate technology throughout the coursework, mimicking the way in which their own technology use might be integrated one day throughout all of the areas of their own classroom instruction. In earlier literature the single course approach proved more common. The single course was seen as an effective way to introduce the many possibilities that computers had to offer for education, and at the same time to lessen computer anxiety in student teachers who might not have a large amount of experience with computers. In a 1992 study examining the effect of a semester long educational computing course on 68 pre-service teachers, the researchers found that, even though most of the students had some type of previous experience with computers, the course still reduced computer anxiety and produced positive attitudes towards computers (Savenye, Davidson, & Orr, 1992). In a survey of 32 colleges with teacher education programs in Michigan, it began to be clear that the single course method was only a temporary fix, the optimal situation being to reach a point of faculty confidence and skill with computer technologies so that the technology could be integrated directly with the teacher education courses (Novak & Berger, 1991). Writing about technology and teacher preparation programs in the early 1990s, Wiebe, a Professor of Instructional Technology at California State University, Los Angeles, wrote

that considering technology "will eventually be thoroughly integrated into the k-12 classroom" teachers should be prepared in technology use in three distinct ways: on applicable software applications, on applying the technology to educational situations, and finally as a part of their methods courses (Wiebe, 1995). New graduates were already agreeing with Wiebe's futuristic call. In a 1991 survey of over 300 graduates from an Iowa teacher preparation program between 1986 and 1990 it was reported that the new teachers did not feel adequately prepared in technology use by their CoE. The survey also found that new teachers called for a class focusing on technology integration strategies as well as for more modeling of technology in teacher methods courses (Topp, 1996). While technology preparation in CoEs has developed much in the last fifteen years, so have the technology and the expectations of its use in the classroom. By the end of the 1990s a shift was approaching. After surveying single technology course model programs, Hargrave and Hsus (2000) noticed that they were beginning to shift their focus away from using technologies for teacher productivity to integrating the computer technologies with the instructional curriculum, consequently supporting the idea that a single course model could indeed teach technology in a way that meets the needs of the future teacher. At around the same time as the Hargrave 2000 study, another study found that when compared with students who learned their computer skills in a single course, those students who partook in classes where technology was integrated with elementary teaching methods courses- classes where they could see the methods modeled and practice with real content-had an increased probability of transferring the computer skills to the classroom (Halpin, 1999). The knowledge that teachers need to have a special type of understanding of technology, one that goes beyond technological understanding or general pedagogical understanding, but instead something more specific to content,

technology and pedagogy combined (Jon Margerum-Leys & Ronald W. Marx, 2004) would permanently push CoEs away from the single course model.

Other research has also supported the claim that the most effective model for preparing pre-service teachers to use technology in their own future classrooms is that of integration with their CoE coursework. Describing a one-year graduate level teacher preparation program as a model of an effective technology integration program, Niess (2001) wrote that the graduates were left with greater thinking and decision making skills in regards to integrating technology in their teaching. In a survey study of three cohorts as they progressed through their teacher preparation program at Texas Women's University that was participating in a PT3 grant to develop their graduates technology integration skills, the researchers found that the students showed positive gains in technology proficiency and positive attitude changes towards technology integration in the classroom (Snider, 2003). Both of these studies, as with the majority of the research on technology integration and teacher preparation, focused entirely on the pre-service teacher. Watts-Taffe et al., from a different perspective, chose to follow three of their graduates from literacy methods courses where technology integration was a focus into their induction year of teaching (Watts-Taffe, Gwinn, Johnson, & Horn, 2003). After collecting planning documents, emails, field notes from site visits, and transcripts from group interviews the researcher concluded that the pre-service teacher's technology related experiences in their literacy methods courses positively effected their instructional decisions.

Arguing for the integrated model earlier than his time, Oliver said that "if (technology) is not a critical component of the instruction and teaching process that student teachers receive in their training, it will be difficult to create teachers who will

place importance on (technology) in their own teaching" (Oliver, 1994). Several other authors echoed this sentiment during the same time period, reminding us that the student teachers will teach as they see modeled in their courses. Christiansen, in her 1998 dissertation, analyzed the effect of technology integration education on teachers and student attitudes toward technology by analyzing results from pre and post tests given to teachers before and after a technology instruction course. She found that if teachers perceive the computer is relevant to their work then the students also see it as important. The application of this research is apparent in a teacher preparation program where, if the CoE professors see and use the computer as an important part of education, the student teachers will approach it in the same way. In describing the rationale for preparing education faculty to use technology at the University of Nebraska at Omaha, Topp (1995) makes clear the importance of faculty use of technology in student learning of technology use in classrooms. Student teachers will teach as they see modeled, a point that makes how the technology side of the teacher preparation program is designed exceedingly important when looking at k-12 classroom technology integration.

In 1993 Wetzel divided the then current ISTE technology standards for new teachers into two groups—those that can be met through a single course approach and those that can be met through an integrated model (Wetzel, 1993), demonstrating that there was no way to meet all of the standards with either approach alone. According to a 1998 study comparing the classroom uses of technology by graduates from different colleges of education taking different approaches to preparing teachers for technology integration, the best approach might not be obvious and a combination of the two models might be advisable (Duhon, 1999).

Though 1993 was a little early for one-to-one ubiquitous technology programs, Wetzel described in his article on technology preparation in CoEs the situation that one-to-one programs are not apt at addressing. He wrote that when teaching a methods class for pre-service teachers, and asking students to apply technology skills they had learned in a single model computer course, the students explained that they couldn't remember how to use the programs as there was limited access to the computer labs (Wetzel, 1993). This brings us back to the earlier discussion on the most commonly cited barriers to technology integration: knowledge and skills, access to the technology, and social factors (such as resistance to change and support within the school community). From the research on barriers and facilitators to technology integration it seems that there are at least two factors that are both fundamental to successful technology integration and under the control of the Colleges of Education: 1) that the pre-service teachers be prepared in how to integrate computers with classroom settings and 2) that pre-service teachers have ubiquitous access to the actual technology they are being asked to learn, while remembering that computer technology initiatives are curricular change, a change that must connect with a teacher's basic understandings of learning, knowledge and pedagogy (McCormick & Scrimshaw, 2001). The benefit of the integrated model over the single course model is that it addresses two of the most salient barriers to technology integration: teacher resistance to the change in their teaching practices that introducing technology brings, and lack of teacher experience with technology integration (Snider, 2003). However, the looming barrier of access to technology is not truly addressed unless the CoE goes beyond encouraging technology in every course, to facilitating technology use at every moment, ubiquitous technology access. For teachers to attain a level of curriculum integration, they require time to practice technology in a comfortable, safe

learning arena (Willis, 1993) and that the CoEs realized that above all else this was not always the case in a computer lab.

As mentioned earlier, at the university level in North America, as of 2003, there were roughly 150 campuses or colleges within university campuses with a universal laptop program in which every student and faculty member has a laptop and access to the Internet (Brown & Petitto, 2003). These programs cross the gamut of departments from engineering to business to education. Unlike many other programs, in Colleges of Education the end benefit of such programs is expected to cross beyond the direct recipients, the students of education, on to their future charges, the students they will one day teach.

While the one-to-one aspect of a CoE program works well to address the issues of teachers' access to technology and teachers' knowledge and skills related to successful technology integration, there are still social issues, mentioned earlier in this chapter, that effect technology integration. In a study designed to answer the question "why don't teachers innovate when they are given computers?" the researchers followed a group of twelve k-12 teachers for one year (Zhao, Pugh, Sheldon, & Byers, 2002). The teachers were selected from a group of 118 who had received a technology grant. The researchers found eleven factors that effect how successful a classroom technology innovation would be. Among the well known features such as access and skills there was also the teacher's "understanding of and ability to negotiate the social aspects of the school technology culture" (p 494). Whether the teachers could access the person in their school who can help with technology and whether they understood the right person to call for guidance in integrating technology, these social factors were seen as important in whether or not

technology would be integrated. Friedman (2002) described a similar effect based on his work with the Center for Improved Engineering and Science Education at the Steven's Institute of Technology. He wrote that for teachers to successfully take advantage of the technology possibilities available to their classroom requires not only technology skills and new pedagogical strategies but also an understanding of the "culture and mores" that go along with this "wired" society. For example, how do you respond to emails from employees versus friends? What is appropriate use of the school email account? What types of websites should be avoided? What are the copyright laws teachers should be aware of and instruct their students in? Understanding these tacit ways of the wired world is, according to Friedman, vital for a teacher's successful use of technology in his or her classroom.

In addition to learning to maneuver through the social world of school technology, studies have also found that time is a major factor in successful technology integration. In a study of six PT3 grant receiving schools - four elementary and two high schools, Vannatta and Fordham (2004) investigated areas not directly related to technology that could be used as predictors of technology use in the classroom. They found through a survey of 170 teachers that a teacher's willingness to commit his or her after school time and the teacher's openness to change combined with the amount of technology training the teacher has received to be important factors in predicting technology use in the classroom. In another study, the researchers conducted a year long investigation at two high schools studying technology use to understand how the technology was affecting students (Peck, Cuban, & Kirkpatrick, 2002a, 2002b). The study, which used surveys of both teachers and students, random classroom observations

and interviews of students, found that the top two reasons why teachers were not using technology could be described as first, the high school departmental structure hampering any possible informal technology-related communication between teachers, and second, time constraints on the teachers. The teacher's social understanding of technology relationships in his or her school, and the learning to manage the many time constraints felt by teachers are not only general barriers to technology integration outside of the realm of a CoE but are especially poignant when experienced by a newly graduated, first year teacher.

INDUCTION TEACHERS

The first years of teaching is a period of great importance in determining whether or not a teacher will continue teaching, and if the teacher does stay what his or her teaching will be like. The "reality shock" of the transition from student teaching to first year teaching can be so great that it leads to the teacher leaving the profession before he or she passes out of the "shock" period (Veenman, 1984). Teacher attrition can be particularly high during a new teacher's induction period, estimated at between 30% (Darling-Hammond & Berry, 1999) and 40%-50% (Ingersoll & Jeffrey, 2004) within the teacher's first five years. After surveying the results of two nationwide surveys and a statewide survey Stockard and Lehman (2004) found that the first year teacher's job satisfaction was the most important factor in whether new teachers stay in teaching or leave the profession. Similarly, McGinnis, Parker and Graeber (McGinnis, Parker, & Graeber, 2004) followed five beginning elementary and middle school science and math teachers over two years and found that a lack of support for the teacher's reform–minded intentions would lead to resistance, moving-on to a different school, or exiting the

profession completely. The causes of teacher attrition have been identified in a wide variety of events including how well prepared the teacher felt for his or her classroom assignment (Darling-Hammond, Chung, & Frelow, 2002), a cause along with the school site technology innovation supportiveness becomes of paramount importance when examining new teachers' preparedness for teaching in a technology rich educational atmosphere.

CoEs are faced with the task of preparing teachers for typical classrooms where not only the common struggles of first year teachers such as motivating students, insufficient and/or inadequate teaching materials and supplies and dealing with the problems of individual students (Veenman, 1984) are rampant, but where technology use is expected to be very high, if not ubiquitous. It seems that only a program where technology is ubiquitous can really prepare teachers for such modern school initiatives. Considering the development of teachers and the possible attrition of new teachers it becomes obvious that what goes on during that first year of teaching in regards to technology use is an important area of examination. Because of the importance of the first year, school districts and CoEs have developed induction and mentoring programs. In a report on an abbreviated version of a mentoring program in which thirteen beginning Canadian elementary teachers interacted with experienced teachers in seminars and were observed in their classrooms, Gustafson, Guilbert and MacDonald (Gustafson, Guilbert, & MacDonald, 2002) found that even though the experience was abbreviated, as with larger scale mentoring programs it promoted professional knowledge and a sense of professional empowerment in the beginning teachers because it reduced the feelings of isolation so often felt by new teachers.

The end results of mentoring programs have been associated with decreases in new teacher attrition rates. Rates have been reported to decrease between 5 percent, according to a comparison of Texas teachers participating and not participating in a mentoring program (D. E. Fuller, 2003), and 13 percent according to a discussion of previous research compiled to illuminate the attributes of well-designed mentoring programs (Holloway, 2001). In a study to examine whether induction programs do in fact have a positive effect on the retention of beginning teachers, Smith and Ingersoll (2004) examined data from the 1999-2000 National Schools and Staffing Survey. They found that beginning teachers participating in programs in which the mentor planned and collaborated with the beginning teacher and came from the same subject field as the beginning teacher, had less movement to other schools or out of the profession.

In another study on programs focusing on the induction period of teaching, Luft, Roehrig and Patterson noted that the program being both structured and focused was vital in regards to its success (Luft, Roehrig, & Patterson, 2003). Holloway (2001) in the above-mentioned discussion of mentoring programs, stressed the structured part as imperative, emphasizing that for the most fruitful interactions the mentors must receive training. Also in a study mentioned earlier, Gustafson (2002) stressed the importance of support from more experienced teachers, thus relieving the sense of isolation often felt by new teachers. Wong, Britton, and Ganser (2005), in a report on five different types of induction programs used in countries other than the United States, show several elements of successful new teacher mentoring programs in other countries. While in the United States, mentoring programs are typically a single mentor with a single teacher, the programs described are occurring in group settings, involving peers, study groups and

research groups, therefore enlarging the new teachers sense of a professional community. The programs described by Wong et. Al. are all highly structured and sustained over a period of time, sometimes two years and sometimes even longer. Well-designed induction programs are those programs that have structure and specific focus while meeting the needs for supportive group mentoring and specific content knowledge, and clearly increase the likelihood that the teachers who are a part of the experience will remain in the teaching profession.

Beginning teachers graduated from a program whose focus is on technology integration have a double challenge of the typical problems faced by beginning teachers as well as the added struggle with finding a way to integrate technology into their teaching and, depending on the school at which they work, into the greater school culture. A beginning teacher's awareness of the culture of his or her school in terms of support for new ideas and change will effect whether the new teachers stays, finds a new place to teach, or leaves teaching all together (McGinnis, Parker, & Graeber, 2004). In addition to effecting whether these teachers trained in technology integration stay and continue with teaching, school personnel with power over the beginning teacher can influence their instructional actions (Atkinson, 2004), potentially erasing all of the lofty intentions of a technology focused program such as a one-to-one technology program. One way to support new teachers to apply what they have learned is for the CoE to support induction or mentoring programs that offer assistance and guidance for negotiating the difficulties of the first year of teaching.

LAPTOP INITIATIVE FOR FUTURE EDUCATORS

In 2002, in the College of Education at the University of Teaching (not the real name), the Laptop Initiative for Future Educators (LIFE) began with the main objective described as "developing teachers who can use technology tools to improve or even transform the learning process" (UT_CoE, 2005). This program, designed with k-12 student learning as its final outcome, has an intermediate goal of preparing teachers who will use technology as naturally as their own elementary school teachers might have used chalk. The program was developed with the main barriers and facilitators to technology integration well known and understood from the years of previous research and experiences described in the preceding pages. It has clearly tried to address as many of the issues under its influence as possible. The program is designed to support CoE students by preparing them with the skills and knowledge to bring technology to the classroom, and CoE graduates by continuing their access to shared communication programs into their induction year of teaching.

The LIFE initiative within the EC-4 teacher preparation program requires students to purchase a laptop computer, requires professors to model technology integration in their classes, and provides wireless access and support throughout the CoE building. The program is otherwise similar to other teacher preparation programs with a course of study giving a foundation in educational psychology, child development and learning theory, followed up by courses in pedagogical methodology and content knowledge.

The technical aspects of the LIFE program were also thought out in detail. A single computer platform (Apple iBook laptops) was chosen to streamline professor training, tech help, access to peripherals (such as digital camcorders), and to obtain better pricing for the students (UT_CoE, 2005). All students entering the professional sequence to

begin their education courses were required to purchase an Apple laptop that includes a CD burner and a wireless card. Bundled pricing including a software package, tech help, wireless internet access, a local online communication system (TeachNet), online tutorials (through Atomic Learning), and support to help the education professors learn to incorporate technology in their teacher-education courses, were all provided by the University. The program also donated older computers to schools where student teachers are often placed to help ensure the continuity of computer use between the University and the student teaching placements. In addition there are plans to develop an online mentoring program for graduates, recognizing the importance of a smooth transition into the first year of teaching. As stated on their website, "as students receive their certification and begin teaching in the schools, the real impact of LIFE will be felt" (UT_CoE, 2005).

The real impact of LIFE is, of course, that teachers indeed use technology in a more integrated fashion in their teaching and that it supports student learning in a way better suited for the twenty-first century. While the stated purpose of this one-to-one ubiquitous technology program is to develop teachers who will seamlessly integrate computer technologies into their instruction, a needed skill and important goal for schools of all levels today, at this point it is still not know if that is indeed the outcome. The first cohort to graduate having had the initiative throughout their program graduated in the fall of 2004 and the second in spring of 2005 semesters. How these beginning teachers, well prepared in technology integration practices and ideas, understand and enact their technology preparation within the context of the demands and realities of their first year of teaching is an area in need of closer examination.

Chapter 3: Methods

It is common sense to take a method and try it; if it fails, admit it frankly and try another.

But above all, try something

-Franklin D. Roosevelt

INTRODUCTION

To begin this chapter I will address the philosophical foundations of the methods used in this study. After this discussion the methods chapter will continue with an overview of the instruments used in data collection and a description of how data analysis was conducted. The chapter will be concluded with a look at how each research question addressed by the selected instruments, and the timeline of data collection.

In this study I used an equivalent status mixed-method, research design with a case study strategy. This description draws from Tashakkori and Teddlie's (1998) description of equivalent status mixed method designs as one of five mixed method designs and from Yin's (2003) description of case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." Education is the perfect example of a research situation where the context and phenomenon are inseparable, and the context is important in understanding the research (Merriam, 1998; R. K. Yin, 2005). In equivalent status designs "the researcher conducts the study using both the qualitative and quantitative approaches equally to understand the phenomenon under study" (Tashakkori and Teddlie, 1998, 18). In this study both the qualitative and

quantitative data collected from a bounded phenomenon in a real-life context were treated with equal importance in order to best answer the research questions. The case study research strategy is particularly open to a mixed-methods research design as it "can be based on any mix of quantitative and qualitative evidence" (Yin, 2003, 15).

Quantitative research, typically positioned within a positivist or post-positivist epistemology (Thomas, 2003), stresses the importance of the separation between the researcher and the subject of the research (Johnson & Onwuegbuzie, 2004) as a technique to ensure greater validity of the results as they are less likely to be influenced by the presence (words, gestures, expressions, etc) of the researcher. The more that the research design is able to isolate only the phenomenon under the research question from other circumstances of context, the more likely the results are to be seen as valid. However this isolation from context comes at a cost: a lack of richness and explanation. The contextual influences upon an action can unwittingly be designed out of a research study, leaving results that do not reflect the true situation in practice, and effects that are not easily quantifiable are often not measured by quantitative research.

On the other hand those with a constructivist epistemological approach, who see reality as constructed by the individual and therefore not something open to generalizibility, have traditionally aligned themselves with qualitative methods (Johnson & Onwuegbuzie, 2004; Thomas, 2003) because they are well suited to describing in a deep and detailed way the context of the research study in addition to identifying the multi-faceted contextual influences involved in the research topic (R. Yin, 2003). Quantitative and qualitative research designs have had a tumultuous history with one another as researchers have laid them at either ends of a continuum and denied their

compatibility (Johnson and Onwuegbuzie, 2004; Tashakkori and Teddlie, 1998). The incompatibility thesis for years had its basis in the differing epistemologies held by proponents of each approach, claiming that the methodology was tied to the epistemology (Gall, Gall, & Borg, 2003). A mixed-methods approach arose, denying the incompatibility thesis on the basis that a research approach is not indelibly tied to a particular view of reality (Yin, 2003). As mixed-methods approach can draw from both qualitative and quantitative research methods and can put both together in a research design, the strengths and limitations of one approach are balanced by those of the other (Johnson and Onwuegbuzie, 2004). Whereas quantitative methods are strong in finding consistencies across populations, qualitative research methods help the researcher examine some of the individual cases within the population more closely to determine why the consistency exists.

In essence, the use of a mixed-methods research design is based on the belief that it is the needs of the research question that should drive the selection of methods in a research study (Johnson and Onwuegbuzie, 2004; Tashakkori and Teddlie, 1998). In a study such as this one of teacher use of computer technology in the classroom, mixed-methods provided breadth and detail, numbers and words, personal reflection and empirical recording. By drawing from different methodologies focused upon the same phenomenon, I was able to create triangulation. Methodological triangulation occurs when the same subject is studied using two fundamentally different methods, making the researcher more certain of what is happening, and increasing the validity of the findings (Tashakkori and Teddlie, 1998). Greene et al, (1989) concerned about the rising number of studies claiming triangulation as a side effect of their using mixed methods when in

fact they are simply producing multiplicity, identified five purposes and related best practices of mixed method designs to ensure the purposes are not thwarted by the design. The five purposes identified were: triangulation, complementarity, development, initiation, and expansion (Greene et al., 1989). In discussing the use of mixed methods for the purpose of creating triangulation Greene et al. stress the importance that the methods selected for triangulation be as similar as possible in their paradigmatic framework and status within the study, yet as different as possible in their unique biases. For that reason the methods in this study were carefully selected to not only provide data towards answering the research questions, but also to do so in a way that creates triangulation as well as multiplicity, development and expansion, and thereby increase the validity of the findings.

DATA COLLECTION

Bounding the Study

Both subject and time bound the study. The teachers' technology-related experiences during the end of the Fall 2005 and the beginning of the Spring 2006 semesters, some of their first semesters teaching, were examined. Data were also collected on their College of Education experience and on their current school context. These data were intended to add description to the study.

Quantitative- Survey

I began the study by gathering the names, contact information, and cohort membership of all Fall 2004 and Spring 2005 EC-4 generalist (not special education or bilingual education) graduates from a large Southwestern Public University College of

Education. A link for accessing an online technology-use survey, the *Technology and Teaching Online Survey* (see appendix*)*, was sent to each of these graduates through email. The *Technology and Teaching Online Survey* included both closed form and open ended responses and had been adapted from the SEIR*TEC Technology Integration Progress Gauge, available online at: http://www.seirtec.org/publications.html and from a campus technology survey used by the Texas Center for Educational Research. The SEIR*TEC survey was originally developed to measure technology integration across many domains including community involvement, and the TCER survey was developed to measure teacher, student, school and district level involvement in the use of technology. The questions on community involvement were removed to match the focus of the research questions in this study, and the wording of questions was modified to focus only on the teacher, the subject of this research study. The *Technology and Teaching Online Survey*, as a data collection tool, began with a question of willingness to participate in the study and also included questions on school description, his or her perceived technology use, access and availability to technology, integration with the curriculum, and teaching style on a student-centered teacher-centered continuum. The Matrix of Research Questions Across Data Resources starting on page 56 demonstrates the research question with which each survey question aligns.

The survey was sent to the last email addresses on record by the University of all 211 graduates from the program those two semesters. When less than 40 graduates responded to the survey, I sent a second email asking for participation, followed by personally addressed paper request to the last permanent address on file by the

University. Ultimately 65 graduates from the Fall 2004 and the Spring 2005 semesters responded to the survey.

There are issues with the type of self-reported survey data, particularly that the teachers might perceive what are the "right" (according to current best practices in teaching) responses, and shift their responses in that direction. Another typically noted problem with survey data is that it does not gather information on the individual and the unique, individual context within which the individual is responding (Thomas, 2003). To attempt to counter these effects the methods included a closer examination through interviews and personal written reflection of their teaching practices by ten of the survey participants.

Qualitative Sampling

A group of 13 teachers agreed to partake in the qualitative phase of the study. From these initial thirteen, ten were included in the qualitative phase. A teacher's openness to participating in the data collection requirements of the study was the determining factor in selecting the participants (Stake, 1995). The sample was limited to recent graduates who chose teaching as a first career choice and who were currently teaching in their credentialed area. This requirement is in place in order to limit the sample to traditional students who are currently working teachers. As a last criterion, in order to uncover as many interesting aspects of how new graduates use technology in their classrooms, uniqueness across the sample such as issues of access to technology and perceived openness of the school culture to technology were searched out. In the end, ten teachers were chosen and included male and female, teachers working in grades pk-5, and from seven different cohorts.

Qualitative-Interviews

Two interviews of each teacher were conducted and used to explore issues of access to technology, the school technology culture, and of factors related to their use of technology in their classroom instruction. All interviews were recorded for transcription and all identifying information was made anonymous for the privacy and confidentiality of the participants. In a spirit of discovery, the interviews were conducted in an interview guide approach format, with a few guide questions created before the interview and follow-up questions to be determined during the interview (Rossman & Rallis, 2003). Two interviews, separated by approximately one month, are seen as important to attempt to counter any effect of a bad day. During the second interview, in addition to guide questions as used in the first interview, the discussion returned to any ambiguity after their first interviews and early survey review. These discrepancies helped to further the depth of the discussion on the barriers and facilitators to technology integration.

WebLogs

After the first interview the teachers were given access to an online technology journal, a WebLog (blog) that each teacher was asked to write in during the two weeks between the first and second interviews. In this journal they recorded their own reflections on how technology intersected with their instruction. These journals are similar in purpose to experience narratives (Thomas, 2003) where an individual directly involved in an event describes their experience to a researcher who can use them to demonstrate commonalities between the experiences of the participants. In this study using a journal shortened the time between event and recording of the event and allowed

me to find common issues amongst the study participants. Some of the teachers preferred to keep their journals in a word document. I told them that they could either copy and paste their entries into the blog or just email them to me if they found it easier. Several elected to email the journal.

DATA ANALYSIS

General

The surveys of the teachers in the qualitative part of the study and their first interview data were analyzed for how they informed the research questions, as well as how the second interview questions needed to be more defined. Findings from the early analysis were integrated into the second interviews and helped to focus and further that discussion.

Qualitative

All of the collected qualitative data were analyzed for how they illuminated the research questions, and the first interview data for how it informed the continued development of second interview questions. An example is in the development of a question on their experiences at their College of Education. The responses to a question in the first interview on the perceived influence of the teachers' college of education on their use of instructional technology opened the possibility that there were two different experiences had by students- some experienced their College of Education as teaching them how to use technology for technology's sake, and some experienced their college of education as teaching them to use technology for teaching. During the second interview the participants were specifically asked this question, and the division became even more

apparent. WebLogs and open-ended survey questions were coded using a starting list of codes based on research that was added to and reshaped throughout the study. Interviews were transcribed and also coded. Coding was continuous throughout data collection and analysis, seen as something fluid rather than fixed. Coding patterns were examined for how they informed certain reappearing themes. These themes were analyzed for how they related to the research questions in light of the theoretical framework.

Quantitative

Survey responses were entered into a database to facilitate sorting of responses. Frequency tables were developed, the mean, median, mode and standard deviation was computed, and the responses were prepared in aggregate form. Factor analysis was conducted on the survey results to create composite variables, and these variables were compared to other data to look for relationships between the data.

DATA COLLECTION INSTRUMENTS

The following were used to collect information and data in this study (see appendix for instruments and personal communications):

- Request for student contact data from CoE for EC-4 graduates from Fall 2004 and Spring 2005
- Technology survey and sampling questionnaire (sent out online by a link sent through email)
- Post survey email contact
- Interview guide questions
- Teacher technology journal WebLog template

MATRIX OF RESEARCH QUESTIONS ACROSS DATA RESOURCES

Certain methods were expected to answer particular questions more than others. The table below relates methods of data collection to related research questions, and identifies specific areas of the data collection instruments addressing each question.

Table 3: Research Questions by Data Collection Method

Research Questions	*Survey*	*Interviews*	*WebLog*
How do teachers define technology?	Section II 1	What does technology in a classroom context mean to you?	
What are the teachers' perceptions of their uses of technology in the classroom?	Questions: Section II 2-8 Section III 1-8	Describe examples of when you have used technology in your teaching this year.	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.
What type of access to technology do the teachers perceive to be available for their instructional use?	Questions: Section IV 1-5 Section VI 1-3 Section VII 3-5	Tell me about the technology you have available to use in your lessons. Describe any ways in which it was easier or more difficult than expected to gain access to the tech. You have needed to complete the lessons.	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.
How do these teachers perceive their technology role in the school?		In what ways do you see yourself sharing you tech. Related teaching experiences with others at the school?	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.
What resources do the teachers perceive are available when they need help with technology in their classrooms?	Questions: Section VI 4-9	Do you discuss your ideas for technology related lessons with any other teachers? If so what types of suggestions did they offer?	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.

How do the teachers perceive the school technology culture's openness to technology integration ideas and activities?	Questions: Section V 1-14	Do you discuss your ideas for technology related lessons with any other teachers? If so what types of suggestions did they offer?	Please write about any experiences that you feel are related to technology in your role as a teacher, in or out of instructional time.
How prepared do the teachers feel their tech.-rich CoE program made them for integrating tech. In their classrooms?	Questions: Section VII 1-4	Where do your ideas for using technology in your lessons come from?	
What non-teaching activities do they partake in at the school that relate to technology in the school?		In what ways do you see yourself sharing you technology related teaching experiences with others at the school?	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.
What resources do they reach out to when they need help with technology in their classrooms?		What type of assistance have you used in the past to help with tech. Related problems in the classroom?	Please write about any experiences that you feel are related to tech. In your role as a teacher, in or out of instructional time.
How do the teachers approach lesson design when technology is involved?		How do technology and the lesson fit together for you? Do you draw on different teaching-skills when you are teaching a lesson with technology? Is your technology related knowledge and skills linked to specific subject areas or is it more general? You are going to teach a lesson on the difference between butterflies and moths, what activities would you like to include in this lesson?	

Chapter 4: Results

There is nothing either good or bad but thinking makes it so

--William Shakespeare

THE COLLECTED DATA

The survey included 60 questions, the majority closed-ended, and some open-ended. The survey was sent to the most recent email addresses on file of all 211 graduates of the College of Education's Fall 2004 and Spring 2005 graduates. Those who were currently teaching were asked to respond. Much of the contact information that the College of Education supplied included out-of-date local addresses, email addresses through the university, and permanent addresses. Many of the permanent addresses referenced local apartments and were unlikely to be true permanent addresses. After several personalized attempts to reach graduates using this information, responses from 30% (N=64) of the target population were collected. Factor analysis was conducted on the closed-ended survey items to determine if the variables were conducive to reducing, and composite variables were then developed and further examined. The open-ended questions were coded and examined for trends across cases.

The 13 individuals who initially agreed to be interviewed and to write journal entries for the second phase of the study came from a variety of cohorts and at the time of the study who were teaching in grades PK to 5th grade. Three people dropped out before beginning with the interviews leaving 10 participants listed in the table below with the

grade they are teaching and the cohort with which they went through their college of education.

Table 4: Second Phase Study Participants

Participant	**Grade Teaching**	**Cohort**
KM	pk	4
SQ	1	5
BC	1	7
WI	1	7
KQ	1	1
DG	3	6
LH	4	7
KC	4	3
UL	5	3
MP	5	2

The ten participants in the qualitative part of the study were each to take part in two interviews and write reflective journal entries on their teaching experiences over a two-week period of time when teaching and technology intersected. One participant of these ten completed only the first interview. I attempted to contact her to encourage her to continue, but she did not return my contact attempts. Eventually her telephone was disconnected. This left nine participants to complete the second interviews. One participant became very ill. She completed the second interview from home but did not feel she was returning to the classroom soon and so was unable to complete the journals.

This left eight participants to complete the journals. The interviews were transcribed. The interviews and the journals were coded and examined for how they informed the findings of the survey, as well as any findings they brought to the surface themselves.

FREQUENCY TABLES

Standard statistical analysis was run on the survey data. Frequency tables were produced and are included in the appendix. For questions on a five-point scale a 1 signifies "strongly disagree" and a 5 signifies "strongly agree", with the center representing "unsure". In yes/no questions 1 represents "yes" and 2 represents "no".

DEMOGRAPHICS

The first questions of the survey collected demographic information from the respondents. The demographics demonstrated the wide variety of backgrounds that the participants came from, representing a range of college minors, grades, GPA's and cohorts. Only the category of survey respondent's sex was overwhelmingly (94%) female. The response rate of 3% male is very close to the 4% male/female enrollment for Fall of 2004 and Spring of 2005. The following tables summarize those demographics. In the following tables a dash (-) indicates the respondent did not provide information for that specific item.

Table 5: Survey Respondents' Cohort Membership

Cohort	Frequency	Percent
-	9	13.8
1	8	12.3
2	6	9.2
3	6	9.2
4	3	4.6
5	4	6.2
6	7	10.8
7	7	10.8
8	5	7.7
9	7	10.8
10	2	3.1
11	1	1.5
Total	65	100.0

The respondents were asked to given their approximate grade point average. The responses for grade point average were grouped into three categories to ease comparison.

Figure 4: Frequencies of Self-reported Grade Point Averages

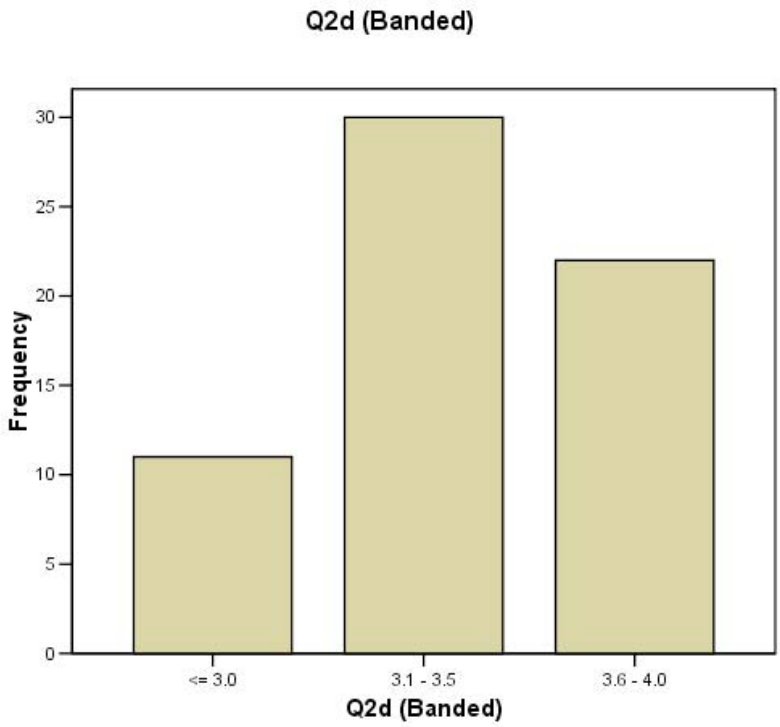


Table 6: Survey Respondents by Self-Reported College Minor

Self-reported College Minor	Frequency	Percent
-	11	16.9
American sign language	1	1.5
Biology	1	1.5
Business	2	3.1
Communications	2	3.1
Early Childhood Studies	16	24.6
Educational Psychology	1	1.5
English	3	4.6
French	2	3.1
Government	1	1.5
History	4	6.2
Jewish Studies	1	1.5
Kinesiology	3	4.6
Mathematics	1	1.5
Psychology	10	15.4
Reading	2	3.1
Social Work	1	1.5
Spanish	2	3.1
Theater and Dance	1	1.5
Total	65	100.0

Table 7: Survey Respondents by Reported Grade Currently Teaching

Grade	Frequency	Percent
-	2	3.1
PK	4	6.3
K	15	23.4
1	12	18.5
2	5	7.7
3	7	10.8
4	16	24.6
5	3	4.6
Not teaching	1	1.5
Total	65	100.0

Table 8: Survey Respondents by Reported Semester of Graduation

Semester	Frequency	Percent
-	6	9.2
Fall 2004	24	36.9
Spring 2005	35	53.8
Total	65	100.0

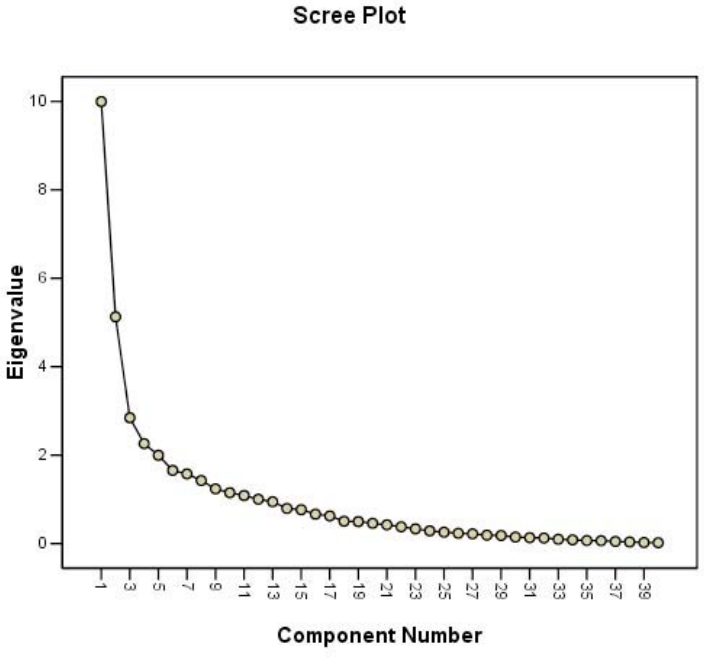
Table 9: Survey Respondents by Sex

Sex	Frequency	Percent
-	2	3.1
Female	61	93.8
Male	2	3.1
Total	65	100.0

THE FACTOR ANALYSIS

An exploratory factor analysis using principal components analysis was conducted on the survey data using SPSS software. Using the Kaiser criterion (dropping all components with eigenvalues less than 1.0) for determining the number of factors revealed 14 factors. However the scree plot has a possible elbow at three, five and six factors, and when the eigenvalue was set at 2.0, six factors were revealed. Varimax rotation was used to identify the strongest variables within a particular factor. The factor analysis was rerun with the factors that loaded weakly excluded. The final scree plot is shown below. Most eigenvalues returned small incremental changes between them, but the first four had more than a .25 difference between them. With this information, together with the elbow of the Scree plot and the correlations from the new varimax rotation the first four factors were determined to be the strongest.

Figure 5: Scree Plot



These four factors were examined for their relatedness by looking at the survey questions that loaded most heavily upon each factor. The survey questions divided by factor are given in the table below. The factors were further developed, analyzed, and prepared for creating composite scores.

Table 10: Survey Questions Loading Table

Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
4	20	21	26
5	37	22	27
6	38	23	28
7	52	24	29
8	53	25	30
9	55	36	31
10		49	32
12		50	33
13			34
14			35
16			39
17			47
19			51

Most of the questions that loaded on factor one specifically relate to teacher's use of technology for learning. Examples of questions falling into this factor are: "Students are involved in learning activities using technology", "I integrate technology into at least

some of my teaching", "Students are involved in technology-related learning activities requiring higher-order thinking skills", and "I am experimenting with new instructional strategies as a result of my use of technology".

Factor two speaks directly to the issue of teacher preparation: the degree of teacher development for both teacher pre-service and in-service training. Questions such as question 20 ("I am actively involved in on-going professional development on technology integration/infusion") and question 38 ("I would agree that ongoing professional development opportunities build capacity within the staff for using technology") are on professional development. Other questions such as 52 ("I felt prepared for integrating technology in a classroom when I first graduated from my college of education") and 55 ("Now that I am in my first year of teaching I feel that I was well prepared by my college of education for integrating technology in my classroom") are focused on the participant's teacher pre-service program.

Factor three, encompassing survey questions 21,22,23,24,25,39,49 and 50, relate to the technology resources available to the individual teacher. Examples of questions that fall into this factor are "Overall I feel as though I have on-demand access to technology at my school", "Internet access and download speeds are sufficient for current instructional practices", "I would agree that technology resources are allocated for maximum use", and "I would agree that a wide variety of technology resources (computers, scanners, digital cameras, software, etc.) exist in the school at which I work".

In examining factor four the questions that become apparent are those with strong leadership and organizational support elements. Examples of these questions were: "I would agree that a plan for technology integration exists", "I have sufficient professional

development and support form the school to successfully integrate technology into my instructional practice", "District leaders advocate that school leaders be users of technology," and "I would agree that a plan for technology integration exists". In this factor the items that become evident are those that only exist if there is a strong organizational level of support for technology use. Another way of looking at it is if "technology" was a product that an organization, in this case a school district, bought, then these questions relate to the support the organization gives to ensure that this new product's implementation is successful.

Using this analysis the majority of the survey questions fell into one of the four composite factors. Ten of the questions, 11, 15, 18, 40,41,42, 43, 48, 54, and 56, do not and they are each addressed in the following table.

Table 11: Survey Questions Not Included in Composite Variables

Survey question #	Question	Determination
11	Students practice responsible use of technology	Not directly related to the research questions. Do not include in composite variables.
15	I use authentic assessment to assess students' technology –related learning experiences	It is possible that the respondents were interpreting this statement to mean that the participants were using authentic assessment all of the time. This question could be reworded in future studies to offer more degrees of understanding.
18	I ensure that policies and procedures for responsible use of technology are followed.	Does not relate specifically to the instructional strategies used by teachers. Do not include in composite variables.
40	Do students have access to school email accounts?	93% said "no" – There are so many issues with personal safety that just because a school doesn't offer this does not mean that it is not supporting technology. Do not include in composite variables. In future studies could be interesting to compare schools that respond yes with those that respond no.
41	Do teachers have access to school email accounts?	Only one person said "no" –this was a teacher teaching in a non-profit pre-k program. For this study do not include in composite variables. Consider including if used in a broader study encompassing more teachers from non-public schools.
42	Do teachers have electronic access to student data?	Interesting to examine this variable in examining how teachers use technology in the design and development of lessons. Keep as a separate variable.
43	Is there support staff available to help with technology hardware and	This question might not have followed the other factors because

	software issues?	teachers were interpreting "support staff" very broadly. Other teachers in their school were sometimes identified as technology support staff. In addition, despite the 95% who responded "yes", most people responded "disagree" to question 48 (see below). The respondents seem to be saying that they have support staff available but that they don't work. This underscores the issue that technology help will have to be broken out in greater detail. Consider revising questions 43 and 48 in future research.
48	When a computer fails and I need tech help it is usually repaired by the end of the day	Most people responding to this question said "disagree" or "strongly disagree". – See number 43 above--
54	I feel that the way that I use technology in my classroom came from what I was taught about using technology in a classroom came from what I already knew about using technology in a classroom before starting the program at my College of Education.	This question was not worded in a very clear manner and respondents were split in their responses. They either agreed or did not. The variance in interpretation may have largely contributed to why this question did not surface with the factors identified in the factor analysis. Consider rewording for future research.
56	I wish that in my college of education program I was taught something that I was not taught relating to technology in the classroom.	This question is in reverse. Like question 54, the confusing nature of the question could be attributing to the variance in responses and explain why it did not surface with the factors. Consider rewording for future research.

A second factor analysis was then run on the larger components to make sure there were not several factors loading within them; there were not. The following table below breaks down the survey questions by their labeled composite variable.

Table 12: Survey Questions Included in Composite Variables

Teacher's use of technology for learning	**Technology resources**	**Teacher technology preparation**	**Leadership and organizational support of technology**
4 Students are involved in learning activities using technology.	21 I would agree that a wide variety of technology resources (computers, scanners, digital cameras, etc.) exist in the school at which I work.	20 I am actively involved in on-going professional development on technology integration/ infusion.	26 I would agree that a plan for technology integration exists.
5 Students are using technology to learn/for learning.	22 I would agree that technology resources in the school at which I work are available for just-in-time teaching experiences, whether through a checkout or by networking.	37 I would agree that professional development activities involving technology are planned by starting with the curriculum, not the technology.	27 If there is, as far as you know, a technology integration plan, school leaders support the plan.
6 Students are involved in technology-related learning activities requiring peer collaboration.	23 I would agree that technology resources are kept in operational order.	38 I would agree that ongoing professional development opportunities build capacity within the staff for using technology.	28 School leaders have designated personnel to support technology integration.
7 Students are involved in technology-related learning activities requiring higher order thinking skills.	24 I would agree that technology resources are allocated for maximum use.	52 I felt prepared for integrating technology in a classroom when I first graduated from the University of teaching.	29 School leaders approve purchase and use of resources needed for supporting technology integration.
8 Students are using technology for learning as a tool for communication, production, and research.	25 I would agree that technology resources at the school in which I work are accessible beyond school hours.	53 I feel that the way that I use technology in my classroom came from what I was taught about using technology in a classroom by my college of education.	30 I would agree that an evaluation plan is used to improve services to support technology-enhanced teaching and learning.

9 Students are involved in authentic, self-directed learning activities involving technology.	36 School/district leaders support continuous professional development opportunities for improving teaching and learning with technology.	55 Now that I am in my first year of teaching I feel that I was well-prepared by the University of Texas for integrating technology in my classroom.	31 District leaders advocate that school leaders be users of technology.
10 Students surpass the school's expectations for technology skills for their grade and stage of implementation of the technology plan.	49 Internet access and download speeds are sufficient for current instructional practices at my school.		32 School/district leaders participate in activities to improve their skills as technology leaders.
12 I integrate technology into at least some of my teaching.	50 Overall I feel as though I have on-demand access to technology at my school.		33 School leaders routinely use technology resources in their day-to-day school activities for operating the school.
13 I develop and implement technology-based learning experiences that promote higher-level learning for the students.			34 School leaders initiate ideas for technology use, review ongoing applications, and encourage staff to gain new skills in using technology resources.
14 I develop and implement technology-enhanced learning experiences that promote collaborative learning.			35 School/district leaders are following policies on equitable availability and use of technology.

16 I use technology to address the diverse learning needs of the students.			39 School leaders include the use of technology effectively as an integral part of the staff evaluation process.
17 I am engaged in creating curriculum-based, interdisciplinary, and technology enhanced learning experiences for their students.			47 I have sufficient professional development and support from the school to successfully integrate technology into my instructional practices.
19 I am experimenting with new instructional strategies as a result of my use of technology.			51 Overall I feel as though students have on-demand access to technology in my classroom.

RELIABILITY ANALYSIS

Cronbach's alpha was used to determine if items identified as belonging to the same factor are internally consistent. Acceptable Cronbach's Alpha scores are those above 0.7, with scores of above 0.8 considered necessary for a good scale. Based on the scores given in the table below I feel confident that I can continue with the composite variables.

Table 13: Cronbach's Alpha on Composite Variables

Teacher's Use of Technology	Teacher Preparation	Technology Resources	Organizational Support
.896	.782	.876	.877

The following table shows the means for each of the composite variables.

Table 14: Means of Composite Variables

Teacher's Use of Technology	Teacher Preparation	Technology Resources	Organizational Support
3.1	3.3	3.5	3.6

The composite variables will be revisited as I further examine the relationships between the data.

OPEN-ENDED SURVEY QUESTIONS

The first question asked on the survey was, "What does technology in regards to school mean to you". In the online survey it was a response required to continue through the survey, but in the paper version that was not possible and some did not answer. Sixty-one participants, more than one fourth of the graduates, gave responses. While an occasional response took advantage of the open-ended format to share an unrelated opinion, most were responses to the above question. The codes in the following table were developed from the collected responses. They refer to how the participant described technology.

Table 15: Codes and Descriptions for Technology Use

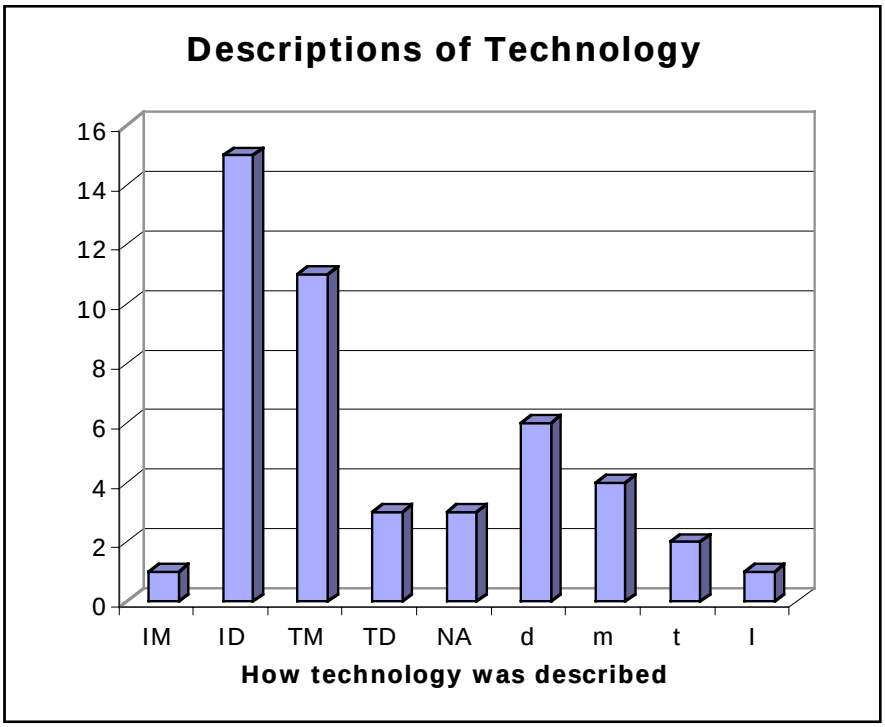
C	Communication device
L	Mentions Learning or furthering student understanding
M	Non-digital Media mentioned (phones, audio tapes, VCRs, intercoms)
D	Digital Media only type mentioned
B	Barriers to technology use mentioned
T	Computers described as Tools (are they always describing tech as computers?)
I	Technology and content describe as Integrated
R	Technology used for Record-keeping mentioned
E	Technology to Enhance lessons/enrich/supplement/engage
O	Technology to Open up the world
F	Technology used to become Familiar with it/comfortable/prepared for Future
X	Unrelated response/ doesn't answer the question

What became apparent was that the participants referred to technology in one of two ways. If digital-based media examples were the only kind given, then integration was also often mentioned. Respondents who gave examples of technology using non-digital examples also spoke of technology as a tool. Codes were developed for these dichotomies to aid comparison of the categories, and after all of the survey data was received the codes in the table below were developed to categorize how survey respondents spoke of technology. The figure below illustrates how often each of these codes appeared.

Table 16: Codes and Descriptions for How Technology was Described

IM Integrated and Media
ID Integrated and Digital
TM Tools and Media
TD Tools and Digital
NA Response not applicable
d Digital only
m Media only
t Tools only
I Integrated only

Figure 6: Descriptions of Technology



It is clear that teachers who spoke of technology in digital terms were also more likely to mention integration than teachers who spoke of technology in media terms, and that the opposite is true for teachers who spoke of technology in terms of being a tool. This fits with the concept from Technology-pedagogical content knowledge (t-PCK) that as a teacher develops in his or her understanding of one facet of t-PCK, in this case the technology, his or her understanding of how it fits with the other aspects, such as pedagogy, will be further developed.

In question #56 participants were asked to express whether they would have preferred that in their teacher preparation program something in particular was taught relating to technology in the classroom. If they responded unsure, agree or strongly agree they were prompted in the next question to explain what they would like to have had taught. 52% of those who responded to this question met these criteria and 19 of those

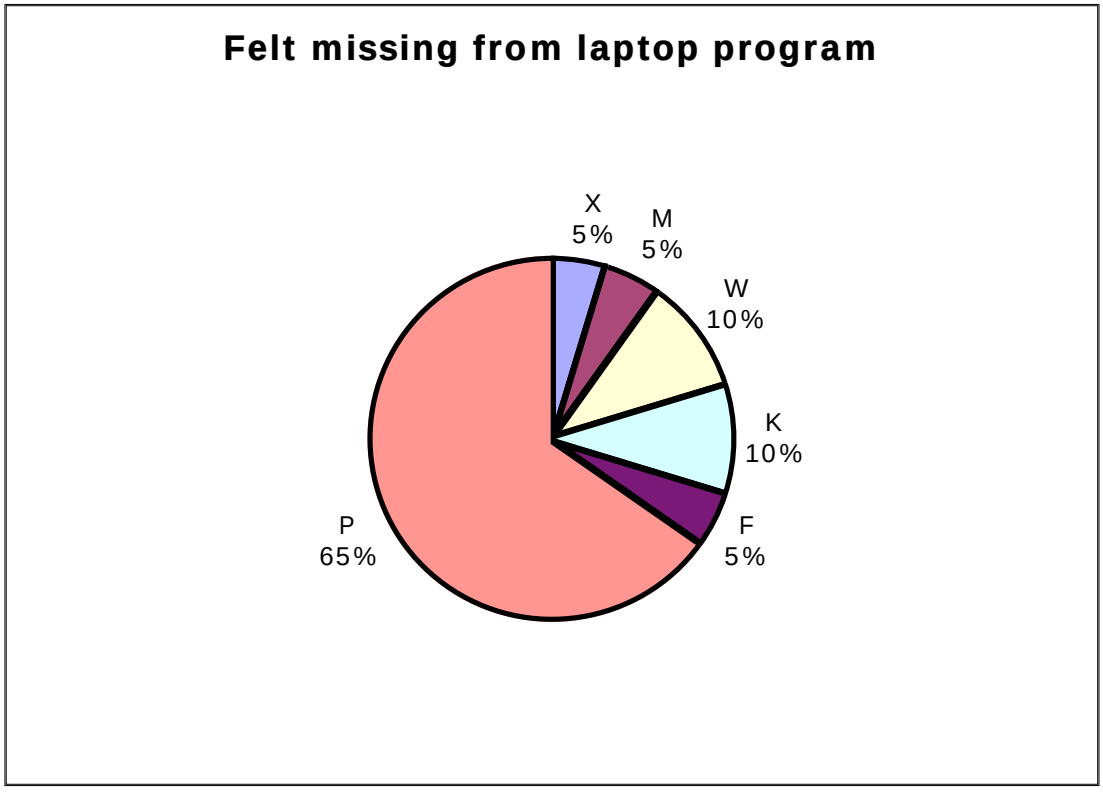
chose to explain what they were hoping for in their college of education. Of those 19, six types of answers were given. The coding of those answers is listed in the table below.

Table 17: Codes and Descriptions for Missing from CoE Experience

X	response unrelated to question
M	managing a classroom
W	making webpages/websites
K	lack of knowledge and skills in professors
F	how to fix minor computer problems
P	integrating technology into daily practice as a teacher

Those codes were charted and the resulting chart is shown in the figure below

Figure 7: What Teachers Surveyed Felt was Missing from their CoE Experience



These results fit with results from the first interview, pointing to the possibility that some teachers felt that they were taught technology alone as opposed to technology for teaching.

CORRELATIONS AMONGST THE QUANTITATIVE DATA

Many factors can influence a teacher's use of technology in his or her teaching. In an earlier chapter essential elements for successful technology integration were identified. The following table takes those elements and categorizes them along side the variables I have developed from the survey.

Table 18: Variables and Essential Elements for Technology Integration

Variable	Essential Element
Leadership and organizational support	**SHARED VISION—**There is proactive leadership and administrative support from the entire system (ISTE, 2000) **SUPPORT POLICIES—**School and university policies, financing, and reward structures are in place to support technology in learning (ISTE, 2000) Direct **access to an individual** who will assist the teacher in bringing the curriculum and the technology together (Pelgrum & Plomp, 1993) (Granger, Morbey, Lotherington, Owston, & Wideman, 2002) (Strudler, 1996) The teacher's **social understanding of technology relationships** in his or her school (Zhao, Pugh, Sheldon, & Byers, 2002) (Friedman, 2002). **Communication** between teachers (Peck, Cuban, & Kirkpatrick, 2002a, 2002b)
Resources available	**ACCESS—**Educators have access to current technologies, software, and telecommunications networks. (ISTE, 2000) **TECHNICAL ASSISTANCE—**Educators have technical assistance for maintaining and using the technology. (ISTE, 2000)
Technology use	**ASSESSMENT—**There is continuous assessment of the effectiveness of technology for learning. (ISTE, 2000) **STUDENT-CENTERED TEACHING—**Teaching in all settings encompasses student-centered approaches to learning. (ISTE, 2000)
Preparation	**SKILLED EDUCATORS—**Educators are skilled in the use of technology for learning. (ISTE, 2000) **PROFESSIONAL DEVELOPMENT—**Educators have consistent access to professional development in support of technology use in teaching and learning. (ISTE, 2000) **CONTENT STANDARDS AND CURRICULUM RESOURCES—**Educators are knowledgeable in their subject matter and current in the content standards and teaching(ISTE, 2000)

From the above table it is apparent that these variables are all essential to technology integration. As a result I would expect to find positive relationships between technology use and each of the other composite variables.

Other variables not included in the composite variables might inform our understanding of how the teachers are using technology in their first year. If the teachers report that they feel as though they have unmet training needs from their CoE experience, then it would seem that they have noted an absence in their knowledge. Noticing such an absence can only come from attempts to integrate technology into classroom instruction. Therefore I would expect to find a relationship between their use of technology and having identified specific unmet training needs. In addition, three other variables: defining technology, identification of perceived unmet training needs and cohort membership, were also considered as possibly influential on understanding how teachers use technology.

The following table shows the correlation coefficients that resulted from analyzing the variables. As the data were often asymmetric Cramer's V was used.

Table 19: Correlation Coefficients of Survey Data

Variable 1	Variable 2	Cramer's V
Teacher's use of technology in the classroom	Teacher's technology preparation	.695
Teacher's use of technology in the classroom	Technology resources	.694
Teacher's use of technology in the classroom	Organizational support	.691
Teacher's use of technology in the classroom	I wish I was taught something I was not at my CoE (Q56)	.687
Teacher's use of technology in the classroom	Cohort membership	.676
Teacher's use of technology in the classroom	Digital vs. media	.718
Teacher's use of technology in the classroom	Integrated vs. tools	.694
Organizational support	Technology resources	.698
Teacher's technology preparation	Digital vs. media	.498
Teacher's technology preparation	Integrated vs. tools	.480
Cohort membership	I wish I was taught something I was not at my CoE (Q56)	.473
Cohort membership	Digital vs. media	.437
Cohort membership	Integrated vs. tools	.380
Digital vs. media	Integrated vs. tools	.680

Based on the coefficients of determination, which demonstrates that a coefficient of .700 only accounts for 49% of the overlap between variables, coefficients between .660 (45%of overlap) and .850 (72% of overlap) will be considered moderately related. Coefficients above .850 will be considered strongly related. Coefficients between .351

and .659 will be considered weakly related. Coefficients less than .350 (12% of overlap) will be considered negligible. The coefficients derived from the variables shows that they are all positively related, whether weakly or moderately. This follows the expectation that led to the examination of their correlations. Of the composite variables, organizational support and technology resources available in the school are most related. This makes sense as I would expect a school with strong organizational support for technology to also provide the resources to make it happen. The strongest associations appear to occur between a teacher's use of technology in the classroom and how he or she describes technology. The weakest associations are between cohort membership and how technology is described, as well as between a teacher's technology preparation and how he or she describes technology.

INTERVIEWS

First Interviews

The first interviews provided an understanding of how these graduates perceived they used technology in their classrooms. The data yielded from the interviews helped to shape the way that the survey questions were analyzed, as well as to develop the questions asked in the second interview. The following pages contain the categories that were developed as the first round of interviews was examined. How these responses fit with the survey responses to inform the research questions will be addressed at the end of this chapter.

The theoretical framework was referred to during this process to keep the questions focused on technology-pedagogical content knowledge. As was discussed in the first two chapters, t-PCK is the knowledge that a teacher draws upon when using

technology with instruction. It is the place where knowledge of technology, knowledge of content, and understanding of pedagogy intersect. An example of how t-PCK influenced the analysis and further shaped the interview process was the addition of two new questions into the second interview. One was "Do you feel that your College of Education taught you how to use technology for teaching, or simply technology and you had to determine how it fits with teaching?" This question was added after it was noted in the analysis of the first interview that some participants spoke of technology as something that stands alone, and some participants spoke of technology as something integrated with learning and instruction. How they have understood the marriage of technology and teaching, and whether they have in fact found that intersection, is informative to the framework. A second question added asked the participants to think aloud as they might plan what activities they would like to put into a second grade lesson on the differences between butterflies and moths. The goal of this question was two-fold: first to get at the heart of whether the teachers are thinking of technology and teaching as something that fits together and second to examine how for them technology fits into lesson design.

Below is the initial coding for statements from the first interview that respond to the research question: "How does the teacher describe their uses of technology". After reviewing these categories several were identified as necessarily drawing upon a teacher's knowledge of pedagogy and content (PCK). Because these examples are given in the context of teaching with technology, those then are t-PCK. Those responses were then grouped into one category renamed "t-PCK". Other uses of technology such as for fun, and for classroom management were not included in the t-PCK code. While they

might be a result of a teacher's reflection upon the content to be taught, knowledge of pedagogy, and knowledge of the technology being used, there was not enough evidence in these interviews to be certain that t-PCK was drawn upon. The redefined codes are listed below the original codes.

Original Codes:

Diff differentiation *

APK Activating Prior Knowledge*

LS to try to reach more Learning Styles*

F Fun

O Organizing thoughts, mind-mapping *

E Extend or enhance something taught in class as students show an interest*

CM Classroom Management tasks

P only mentions a program, not how it was used

DC used to Deliver Content (such as a computer connected to a television) *

RSCH used for student Research *

SA technology stands alone

I technology Integrated

New Codes:

TPCK/I Technology Pedagogical Content Knowledge in their response

F/SA describes technology use as for Fun Alone in this particular instance

CM Classroom Management tasks

P only mentions a program, not how it was used

When these categories were combined into t-PCK twenty-six instances of t-PCK arise. Also interesting is that t-PCK codes are never found in isolation, they always appear with integrated, demonstrating that in these cases teachers described their use of technology as closely integrated with the content.

Table 20: T-PCK instances in the first interviews

	tPCK/I	P	CM	F/SA
BC	2		1	
DG	1		1	
KC	4			
KQ	3			
KM	3		2	
LH	5		1	
MP	4	1		
SQ	1			2
UL		1		1
WI	3			
totals	26	2	3	3

Also arising from this question is that in only three instances does any teacher mention technology use for fun without also describing an accompanying instructional benefit. While the teachers were all open to the motivating properties of technology, "I think the computer attracts them to learning because they don't know that they are learning they think that they are playing games -RP", only one mentioned an activity whose only purpose was solely for fun. I take this as further evidence of t-PCK development. The teachers are able to describe the educational value of their activities with the students, whether it was making shapes in a PowerPoint or capturing on a computer screen insect wings through the enlarging powers of a digiscope. These

activities were all fun. but were presented as a bi-product of the learning experience; the learning was given as central. Several questions during the first interview led teachers to discuss how they interact with other teachers in their school when technology is the topic. The following codes were developed on this topic:

SI sharing ideas

FH functionality help

FC fixing computers

From the research on barriers to technology integration reviewed earlier in this chapter, it is known that technology integration cannot thrive in a climate that does not support technology use. As comments made during the first interview regarding the environment in which they are now working were examined, the following codes were developed.

SR school and district resources are encouraged to be used

B mention barriers

OTR other teachers are receptive to their sharing

OTS other teachers share ideas

In addition to the school where the teachers are currently teaching, the College of Education from which they graduated influenced how they use currently technology. The following codes reflect the various ways in which the teachers describe the influence of their College of Education (CoE).

SC CoE experience showed them Internet sources of content

CC CoE experience taught how to use your computer in your classroom

P/T CoE experience taught how to use a certain program or tool with the computer

T/T Explicitly mention that CoE experience taught them how to put teaching and technology together vs. that

T/isol UT taught them technology isolated skills

SR They still refer to something or someone from their CoE days for help

From an examination of the responses to this question it was decided to add two new questions to the second interview. Several participants complained that in their opinion the laptop initiative only taught them to use particular software, but did not prepare them to use technology in teaching:

> LH - this is going to sound awful, but I don't really feel like we used technology. I don't feel like they taught us much about technology. I know we used PowerPoint and I know we use Excel and Internet searches and Word. But I don't really… we didn't branch out very much.

> SQ- . We never really explored any of the programs or how to use them. We did use iMovie, but I haven't figured out how to use that in a first grade classroom yet. So they didn't really explain to us how to use iMovie in a classroom. I just kind of have to figure it out on my own.

On the other hand, other participants describe a very different interpretation of their experience:

> KQ -I feel like without so much practice we had to make iMovies, or PowerPoints or what not, I probably would not be using it.

> MP - We had the laptops that were with us at all times, so that was an easy access to a great resource there. And a lot of lesson plans our professors would ask us to incorporate technology. So you know, when they did that, it forces us for ways to incorporate technology that now I think has probably become pretty natural for me to just do it. I don't think about it as, oh I've got to incorporate this technology. I just find myself doing it.

When reading these excerpts it is important to keep in mind that this group was the first year all cohorts went through the laptop initiative. As change in education can take five years, it is not surprising to find these types of statements (Hall & Hord, 2001). Still, the various interpretations from different participants led to the question of whether cohort membership and therefore professor's influence could be affecting how technology was being used. I decided that in the second interviews I would ask the teachers to which cohorts they belonged. The identification of their cohort would allow us to know which professor was their cohort coordinator. It was also at this point that cohort membership was requested from the college of education. Those data were then added into the survey results, allowing cohort membership to be used as a variable when examining the survey data.

In examining how the teachers are using technology it was noticed that they described their approach to lesson design in only a few discrete ways. The following codes were developed to capture these distinctions.

CF content first

TF technology first

I integrated/both together

OI their own ideas

OTI other teacher's ideas

DI district ideas (district plans)

CH technology is challenging to integrate

E technology is easy to integrate

To further develop this question, an additional question was added to the second interview asking the teachers to imagine they are planning a lesson on the differences between moths and butterflies. The interplay in their minds between the content and the technology will become evident.

Second Interviews

The second interviews were designed to provide more detailed information, augmenting the results of the first interviews. Since the questions were now focused on issues that arose out of both the first interviews and the survey data they were able to further inform the survey data. In the following paragraphs are several themes that arose out of the analysis of the second interviews, and ways in which the survey data further informed those findings.

The professor effect

In several of the interviews the teachers shared that they felt as though they were not taught to use technology for teaching. They expressed that they felt as though a knowledge surrounding the fit of technology with teaching was not explicitly taught in their College of Education. However, two different interviewees mentioned one professor as having taught them to use technology for teaching. According to the teachers interviewed, this professor, who was also a cohort coordinator of cohort 3, gave all of her students digiscopes she had acquired through a grant. She also gave them assignments in which they were to design science lessons that would use technology to further the lesson's concepts. She gave them the means, the opportunity, and the guidance to develop their t-PCK. Perhaps most surprising is that the teachers demonstrated in their interviews

an awareness of the difference between this class and others, and of the effect that this professor's class had on their understanding of using technology in teaching.

> UL: Really to be honest, the whole laptop initiative I thought they didn't really have any good use of the laptop because in all honesty we never really use the laptop in class. Most of it was lecture based. So I felt like they gave us the technology to use and stuff we could use, but didn't really show us how to implement it. I felt we really didn't need the laptop when we did the education program because I don't think the teachers really knew what to do with it. … I think it was the professors. They weren't sure how to use their laptops to do the class. The only teacher I think that actually made us use our laptop was --------. That's because she made us do lessons on the Internet to represent to the class. She gave us all a free digiscope, and I actually use that in my class as well.

Even a participant who spoke of herself as very technology competent described the benefits of having had this professor who was able to bridge the content and the technology. The following excerpt further demonstrates this professor effect.

> KC- I took a science class you have to take that talks about all the science. That class allowed me to actually experience how to use technology in your teaching. All the other classes I felt like they made us buy this computer and taught kids how to use it, but never really relate it to elementary education. She really wanted to put our computer to use. And a lot of teachers felt like that was pressure for them. So they just made up things I would never ever do in my class for us to do.

I would expect, looking at this through the framework of t-PCK, that those participants who were in this professor's science methods classes would be more adept at integrating technology in their science classes than in other classes. To examine this possibility I explored the relationship between membership in cohort 3, the cohort of this particular professor, with technology use. From the survey data I saw that when cohort membership was compared with technology use the results were a moderate association (.676). Teacher's use of technology was then examined limiting the cases to cohort 3. The results are captured in the table below.

Table 21: Teacher's Use of Technology and Cohort 3 Membership

	Mean	Median	Standard deviation
Cohort 3	2.96	3.0	.33
All other cohorts	3.09	3.1	.78

From the above comparison there was not found the expected difference. However, these numbers were compared with only 4 cases in the cohort 3 row and 56 in the other row. To see if there is a difference if each cohort was examined separately I did the same comparison with all of the cohorts, excluding cohorts 10 and 11 as they had fewer than three members represented in the study.

Table 22: Teacher's Use of Technology and Cohort Membership

	N	Mean	Median	Standard deviation
Cohort 1	8	2.76	2.96	.66
Cohort 2	6	3.44	3.34	.87
Cohort 3	6	2.96	3.0	.33
Cohort 4	3	2.82	2.92	.39
Cohort 5	4	3.25	3.27	.51
Cohort 6	7	3.36	3.30	.96
Cohort 7	7	3.33	3.53	1.05
Cohort 8	5	3.41	3.54	.35
Cohort 9	7	3.16	3.07	.95

In this question a score of 1 represents strongly disagree and 5 represents strongly agree. Overall the survey respondents from cohort 3 do not describe their use of technology as particularly stronger than other cohorts. However, it should be noted that the students in each cohort are taught classes by four professors. If a cohort experiences one exceptional professor and three average professors, the effect from the exceptional professor could become lost in the averages. What does arise is that Cohort 2, a cohort that was led by a professor with more experience in the laptop initiative due to his having

led a cohort through the pilot year of the program, shows the highest average score on Technology Use.

The supportive school

Those teachers who described their knowledge of using technology with teaching as having developed during their first year of teaching brought to the surface the question of what helped that knowledge develop. In the excerpt below one participant described how she and her mentor teacher worked together to develop a project integrating research, PowerPoint and reading.

> BC- last year when I was subbing… I did a little PowerPoint. And once I did the PowerPoint presentation my mentor teacher wanted to do a sort of research project for two of her high readers. So she had them start reading books. And so then I had the idea, well what if we do a little PowerPoint presentation that they can make and find what they think are the important features of whatever animal they were researching and we can make the PowerPoint and they can show it to the class and kind of be able to read it and present it to the class. And so we did that and it turned out really well.

BC expressed that her College of Education experience prepared her predominantly in how to use technology and only "some" of how to use it in her first year teaching, making the effect of the supportive school all the more apparent. In LH, who was in the same cohort as BC quoted above, I hear from a teacher who feels very strongly that what she learned about putting technology with teaching came from somewhere other than her CoE classes.

> LH- I don't feel like I really learned a lot of technology at (my College of Education). And the only thing that we did with technology that corresponds with teaching that I can remember is in my reading difficulties class we went over some web sites and one of my language arts classes, we did something with Kidspiration. But that was a disaster because we were doing units, and to get

> inspiration we downloaded it free for three weeks, but we needed it for the whole semester and then you couldn't access it anymore, and everything that you did was lost. It was just awful. I mean the things that they did show us, I guess it was kind of obvious how to do it in your teaching.

As was mentioned earlier, at the time these teachers went to their CoE the laptop initiative was in a very early form. This comment is consistent with what I would expect in an early phase of a program. At the time of this writing, one and a half years later, students are given licensed copies of Inspiration and Kidspiration when they begin the program. However, when these teachers went through, it was a different experience. In LH's other interviews, I am able to discern clues to inform us of from where she feels that she learned to use technology. The following excerpt shows that it was at least partially through the supportive school, the environment where she is currently teaching.

> LH: My mom's a fifth grade teacher and we're pretty good friends with one of the language art teachers in third grade. And we were just kind of talking about it. I don't remember who said it...wouldn't it be fun if blah, blah, blah.
>
> LA: Then you guys kind of added to each other's ideas as you went on through the discussion?
>
> LH: Yeah.

The teachers in this study apparently learned how to connect technology with teaching partially from the classes they took, and partially from the supportive school environments in which they taught. They also learned how to connect technology with teaching from their own reflections on their experiences trying to teach with technology.

Learning From Experience

BC, the teacher in the first quote under the supportive school section, continued to discuss how in the middle of a lesson she "kind of tweaked it once I was working with the kids to find out what they knew"**.** She has learned from her experience working with technology, the curricular content, and the students, and she is adjusting her teaching accordingly. She is describing t-PCK development.

Here, in an excerpt from another teacher, is another description of her t-PCK development.

> KQ-I use (computers) more often. Before I wasn't sure how to integrate them. I think I was afraid it could take more time to plan a lesson, or more time to actually get it going. But now that I've already done several things and used them, I know it's not like a faraway option that I would probably think about while I'm planning**.**

KQ , like BC above, developed her t-PCK after doing an activity involving technology with the students. Several of the teachers in the first interviews said that they wished they were taught particular computer applications in their college of education, programs that would be useful in their elementary classrooms. KQ continued in the interview quoted above to describe how she spent an hour learning how to do something with a particular program before teaching with it. She now has that knowledge and does not have to revisit that learning curve. It is by practicing, by learning, piece by piece, how technology, content, and pedagogy go together, that some teachers are apparently gaining competency teaching with technology.

In the excerpt below another teacher who felt that "we never really used the laptop in class" describes how he learned to use technology in his teaching by routinely trying out different teaching applications.

> UL- Well I used all the resources (the school) gave me. Like United Streaming or Atomic Learning. And just kind of looked on United Streaming to see if there's anything to accommodate what I teach…I try to work that into my lesson so I can present it to my class.

This pattern of learning to use technology in teaching by using it in teaching, learning through practice with technology, is evidenced again and again in the interviews in WI's comments on her growth over this first year:

> WI- In the beginning I wasn't really thinking, how can I extend this lesson as much and how can I integrate technology. And now I'm getting more comfortable having things down more and I can kind of think about where can I put some of the technology in, or where… how can we extend this. And so I am thinking more about that kind of stuff than I was in the beginning of the year. Well I guess basically when we're in planning we don't plan how am I going to integrate technology. So that's why it was just one of those extra things. But now I'm just realizing the importance of it and how I can make the lessons better. So when you're planning you integrate it and make it fit I guess you could say.

MP summed up learning from experience quite well in the following statement:

> MP- I think UT taught me a lot of technology and some technology in teaching. But the thing about teaching that I realized this year is that you really have to do it a lot. You can learn a whole lot, but you also have to do it. And I learn through the experience of doing it. I feel like actually having crafted incorporating technology, each time I kind of learn a little something, that that worked, or that didn't work, or I'm definitely going to do that again.

In light of technology use and how new teachers approach integrating technology in their classes, the similarities between the teachers are worth noting- they are all trying it out, learning from experience, in a supportive school environment. This brings the analysis to

the next point arising out of the data: in what ways do the teachers describe their t-PCK as developing.

T-PCK development

The interviewed teachers varied between those who reported not knowing how to use a Macintosh before beginning the program, to those who described themselves as extremely technology proficient when beginning the program. Despite the level of technology proficiency with which they entered their College of Education, the teachers all described growth in their ability to apply technology to learning situations. Through their first five months of teaching, their interviews reflect their increased ability to integrate technology with the curriculum.

> KC- I definitely am improving every day on that. I'm not just using PowerPoint, you know. I use PowerPoint as a baseline and then allowing me and my students to expand it from PowerPoint rather than just using it as the main.
>
> KQ- Yeah, I mean there's some things that I've learned. Like I didn't know about Kidspiration and things like that. I've learned different things I could as technology.
>
> KM- I guess the time that I've set aside to do that with them has increased by my own choice and classroom management. I redid the whole schedule of the classroom, and so there's a lot more time for me to do that.
>
> LH-- At the beginning of the year it took a lot more thought to be prepared, to do a lesson, and think about, well would it be really easier or would it be better for the kids to do it a different way. Or should I make a PowerPoint slide or should I do United Streaming. It took a lot more thought. It's not thoughtless. It's not, not having to think about it anymore, but it's requiring a lot less energy to kind of gauge what needs to be taught.
>
> SQ- I'm in the technology committee for the school. So I'm the representative from first grade. So I have to pass on whatever I learn from the meetings to the rest of the team. And I think just learning about the new programs there makes me want to use them because I know about them. I think at the beginning of the year it was harder because I didn't know a lot about the things they had available. Well I think either by doing these things this late in the year, I think I would next

> year start them a lot earlier. Just kind of learn from mistakes or things I could improve upon.
>
> UL-- So I've not been using technology in my last semester because I didn't have the resources to or I didn't feel the kids would understand it as much. But now that some of the pressure of TAKS is leaving them, and they're open to new ideas, it helps me get some new points across that I didn't think I could in the past. So I think it's an opportunity if we try something new with them and see if it works.
>
> MP- At the beginning of the school semester I was very hesitant, now I'm very comfortable with technology and I know how to use a computer and I know how to use a lot of the materials for our science lab and things like that. But I just wasn't used to planning the lesson and incorporating technology for me to use in front of my students and incorporating technology for my students to use.

It is apparent from the interviews that not only were the teachers learning about technology from their technology use experiences, but they were more specifically growing in their understanding of how to integrate technology in a classroom. This is a skill that combines an understanding of how technology fits with the curriculum as well as of how it meets the learning needs of various types of learners. The other categories referred to earlier, the professor effect, the supportive school and learning from experience, all end up here, where the teacher integrates technology.

Lesson Design

In the second interview I asked all of the teachers to imagine that they are planning a second grade lesson on butterflies. What activities would they include in this lesson? I coded the results by where in the lesson they described using technology (beginning, middle or end) and how integrated it seemed to be with the central fabric of the lesson.

One approach to lesson design with technology that emerged from the interviews was when technology is used at the end of the lesson as a way to present student work.

> BC- Well I'd probably start with maybe with what they already knew about those insects. And then for a difference of maybe a key chart or a diagram to show the differences. And then maybe the stuff they have in common in the middle of the diagram. And then I would probably do an extension that would be like a PowerPoint presentation where they would plug in the information once they had it all on paper and decided all the things that were important and maybe make like a little slide show of it. Maybe like take pictures of those insects with digital cameras or something like that.

This is also seen in their description of writing lessons where the computer is being used for the publishing stage in the writing process:

> BC- I have the chart paper. And I give them whatever the topic is, so whatever I want them to write about, I don't know, the time they saw a moth or butterfly or whatever that's related to that. And then we would just start talking about it, and then I would model writing on the chart paper. Just model the conventions of writing that we expect in first grade. And then they would go back to their seats and they would start writing in their draft book. Then after that we would go through the writing process in conference and then end up publishing on the computer. Obviously not all in one day.

Another place the teachers appear to address technology is in the middle of the lesson. In this position it was apparently often used as a research tool.

> KQ- Well I would go with just regular pictures. Like maybe color pictures they could actually hold and see. Then maybe go into lots of web sites maybe. And we could show them online. There's one where they have butterflies in action, show their butterflies. I'm pretty sure we have butterfly insect videos where they're talking about differences between the two. Maybe if someone had a moth or a butterfly. Have a video camera on it and watching them for a day. Or they could have a science journal where they see different things in the day that they write down. Things that they saw between the butterfly and the moth, what they did, what they looked like, the difference and similarities. Have them give a report to the class.

WI- Okay, well I would probably read books on both insects and moths and butterflies. Probably read books on them and probably do, in our school, in our district, thinking maps are really big. So I probably would do a double bubble comparing as a class. Comparing butterflies and moths. Then I would probably have them do a practice doing maybe their own double bubble. That could be one day doing their own double bubble at their desk, compare and contrast which is a good prewriting activity. And then they can maybe research it a little further on the computer about the differences and similarities and add that to their double bubble and come up with a research paper.

A third place teachers placed technology was integrated throughout the lesson design. In this position it was so intertwined that the entire lesson would have to be rethought if the technology was removed.

LH-- I would probably Google it to see what other people have done. To see if there was any sort of story that went along with comparing with either moths or butterflies, or preparing the two. I would go to United Streaming to see if they had any sort of little cartoon or little word building activity. One of the things we really liked about United Streaming was the adjective building. It kind of painted a picture with words. And they have all kinds of little find the differences, interactive programs running on streaming, and go look and see if there's anything on that. I probably wouldn't do a PowerPoint presentation for something like that. I would ask other teachers in my class and see what they had done or what they were thinking about.

UL- I would probably find different types of videos on United Streaming about butterflies or moths. I would try to find some interactive web sites that show you how to compare the two if it's very child friendly to their age. I would show them, like what's on this thing, it will show a butterfly or what it can do. Click on another one to show the moth and its qualities. And kind of a compare and contrast activity.

SQ- I was trying to talk about patterns, I could show them the little scales on the wings through the digiscope, which I did. And if I was talking about the moth I could probably put the antennae because one of them has a ball at the end and one doesn't it? That would be easy to see on a microscope. I would also bring in examples. I had a butterfly I had in a little container that I brought in so I could bring in a butterfly and a moth and make it compare. We could do then a diagram. We could also do a diagram on Kidspiration. Just make a little booklet for facts, kind of like note taking for primary where you just make a little booklet and we could have facts about each one. Draw pictures of the patterns and different types.

The teachers appear to have several design options available as they approach technology in the design of their lessons. Technology can clearly come anywhere in the lesson. I now turn to examining what is happening in their instructional day.

JOURNALS

The journals revealed what these teachers report going through to incorporate technology: what they wish they could do, their disasters, and their ecstasies. Comparing the journals to the interviews the teachers were much more open about challenges they faced when writing their reflections than when speaking to me directly. The journals captured information that was less filtered and closer to the reality faced by these teachers. I looked at the reflections with these thoughts: how are these teachers using technology, what are the frustrations they describe, and how are they learning from what they do.

Using Technology

> WI- On Feb. 2, we talked about the history of Groundhog Day and its traditions. I knew that a lot of my children were not familiar with the groundhog and probably had never seen one before, so I went on the computer and searched for different articles, pictures and even videos on groundhogs. It was very interesting and even I learned a lot about the groundhog.

In the above excerpt, WI is describing a type of technology use that appears in several of the journals. I will call this type of use spontaneous extension. Spontaneous extension seems to happen when the class reaches a topic that either the teacher doesn't have an answer to, or that the teacher needs images to help demonstrate. The teacher then models how adults find answers to their questions by turning to the Internet.

> UL- We were …doing a science project discussing types of consumers and examples of herbivores, carnivores, and omnivores. Students were asking me if their animals were examples of each, so the students and I got on nettrekker.com and looked up the animal and its diet. Students continued to ask me if they could look up their animals too, so I let the students get on the computer 6 at a time and research their animals
>
> UL- We also listened to the computer to an old radio broadcast of War of the Worlds by Orson Welles. The students had read a TAKS practice test about Welles and were interested in the broadcast so we looked it up online.
>
> LH- In reading How To Eat Fried Worms, the class and I did not understand the word deracinate (pg. 36), so a student looked it up for us on dictionary.com.

In addition to the spontaneous extension the teachers also describe in their journals using technology for planned extension. In planned extension the teacher has identified websites or activities to add to the topic being studied in class but not integrated with the body of the lesson.

> LH- Students took AR tests. Students were introduced to this week's CLA (computer learning activity) as a center to do when all other work is finished. This week's emphasis- subject verb agreement. Website: http://www.bbc.co.uk/skillswise/words/grammar/sentencebasics/verbsubjectagreement/game.shtml
>
> SQ-- We used a Math program for addition and subtraction in the regular computer lab today...I think the program helped them understand how to add the ones column and then the tens column. We have been talking about place value this week in the classroom and use two digit addition and subtraction daily with our morning math practice. The game also had them put numbers in order from greatest to least which is a skill for this nine weeks.
>
> KQ - I had an idea about checking on the Digital camera to take pictures on my first graders. Every one of them has at least lost one tooth. (in the front area too ☺) Last week, we wrote about our first experience loosing a tooth or their most memorable one. I thought a good way to review/discuss things that happen and show that their writing is important was to create an imovie with their picture and a brief tidbit of loosing their first tooth.

A third way teachers described in their journals how they are using technology was teaching the technology itself. During their journaling period one teacher taught her class of first graders how to use laptop computers and another started her class on learning.com, a district purchased series of online lessons for using programs such as Microsoft Word.

The fourth way in which the journals reveal the teachers' technology use is what could be called "integrated from the planning stage." When the teacher had planned from the design stages of the lesson that technology was going to be involved and the technology use is therefore woven into the fabric of the lesson, it fell into this category. The following excerpts exemplify this approach to technology in lesson design.

> SQ- This week they were on their own to create a picture (in kidspiration) to be their inspiration for a writing piece. I reminded them of their assignment and how every picture or stamp must be related to what you are going to write. I also told them that it would be smart not to add too many stamps because they all must be characters in their writing. Many students wanted to use the background of a baby's face which I had not expected. I had to ask the class what the "setting" of a story was to keep them looking for backgrounds with scenery.
>
> LH- I introduced out next big project. The Ms. Aleaneous Project. I asked students to start thinking about a four syllable word and its meaning during their free time in class and over the weekend. This project has a mandatory seven slide minimum power point presentation. Students researched four syllable words on excite and used dictionary.com to research the meanings.
>
> WI- I wanted a way to get their attention before starting the lesson. I decided to do a powerpoint presentation with pictures of different animals and people sleeping, and I made them figure out what they all had in common. After discovering that they were all sleeping, I decided to a do a circle map to think of other words for sleeping (such as napping) to tie that in with the story because I wasn't sure if they were familiar with that vocabulary.

Experiences

In addition to the way teachers used technology, the journals also revealed the experiences of using it. What were the barriers and frustrations that they faced, if any, when using technology in their classes? In this first excerpt, a first grade teacher describes the difficulties of getting 21 six-year olds logged-in at the school computer lab.

> BC- with 21 kids in the computer lab by myself, it is quite difficult to get them all ready to go (ie. getting on the internet; typing in the correct website, etc...) i had prepared cards for them that had their username and password on them, hoping to alleviate some of the stress. Well, once we got there, my nerves had served me right. it was extremely difficult to get them all setup. we have a monitor that puts my computer screen up on a big screen so they can all see it, so i could explain each step. but this was still very difficult for some children. it was also very hard for the kids to find certain letters on the keyboard so i was running around the computer lab like a mad woman trying to get them all on learning.com and get their username and password in there. i was very very very frustrated. by the time i got them all on the start page, we had used about 20 minutes of our computer time which was annoying!

Here another first grade teacher, also in a computer lab, shares her experience balancing the needs of 20 eager students.

> SQ- Occasionally, I had computer trouble where they would freeze up. I have one other teacher with her class in the room so it is a mad scramble to help everyone with their hands raised and fix frozen computers.

As students get older the challenges faced by their teachers shift from helping them with the computers to just finding time to go to a computer lab. Below, UL, a fifth grade teacher, described the difficulty balancing the demands of high-stakes testing with technology integration.

> UL- Unfortunately I was unable to really use technology in my lesson as we were spending most of the week preparing for the reading TAKS test.

LH was also bemoaning the lack of time to spend on technology in her class as a result of the TAKS test. In the excerpt below she anticipated a possible solution in which she would be able to use technology to help with standardized test preparation. The arrival of a remote answer system at her school will allow students to communicate their responses to multiple-choice questions simultaneously to the teacher's computer that will then tabulate and display the class results.

> LH- We spent A Lot (stress is hers) of time going over a TAKS writing practice that we should have done a better job on. It would have been nice to direct teach this with the remote control system question by question instead of correct teach it three days later.

Only one teacher had a situation without access to the Internet, the lone Pre-K teacher. KQ has a very limited technology situation with only one computer in her PK class. She would like to use programs such as Starfall with her class to introduce reading, but with only one computer not connected to the Internet it just isn't possible. Her frustration comes through in her interviews and her journal:

> KQ-Technology is not a big part of lessons taught throughout the day. The students are allowed access to a program Bailey's Playhouse during free centers. I have not allotted personal instructional time with the computer. I would like to.

Learning from the experiences

From their journal reflections, it seems that the teachers in this study learn from their experiences, demonstrating the possibility for growth in their understanding of how technology, content and teaching intersect.

> SQ- Now that I have them interested, my new job will be to think of more activities using the laptops. It is a lot of equipment to handle. It would be nice to

have a textbook or activity book with ideas for lessons. I think I might make a page with technology vocabulary that we learned today to keep the terms fresh in their minds.

WI- I realized after that (searching the internet for information on Groundhog's Day) just how convenient and resourceful the internet really is in your classroom, because sometimes we do not have pictures available for the topic we are discussing. The internet (with the VGA) device is a fast and effective way to introduce or top off a lesson.

BC- i decided to use the computers to represent the surveys… the students were to pick a representation (stars, smiley faces, etc...) as a group. once they picked their representation for each way to get to school, we talked about the numbers and how many of each representation they would need. i started having the students physically do it on the computer, but i quickly realized that it wasn't going to work. they had not had enough experience with the computer, let alone with picking out the pictures and getting them on the word document. so i changed it and i did the actual computer part, but they told me everything to do. then they had to come up with their number sentence and word sentence and i typed it for them. in the end, it went really well and the students were able to see another way to represent math problems…i think this was the best use of technology so far this year.

Results by Research Questions

In the preceding sections the data collected in this study were examined following their natural development. I will now turn to examining the ways in which the survey, the interviews, and the journal entries have together informed each of the research questions. The first research question was: "How do beginning teachers who have been in a ubiquitous computing environment perceive of technology in their teaching in elementary school classrooms?" This question had several sub-questions to guide the exploration of the question.

How do the teachers define "technology"?

How teachers defined technology informs us of how they were thinking of technology. The data showed that definitions from the teachers could be broken into two

categories--those who speak of technology in terms of digital only examples and those who speak of it in a more general media, or a means to deliver information, terms. Interestingly I saw that digital and media also relate to "integrated" and "tools" as other ways to describe what the teachers are thinking of technology. The following list gives examples of each of these categories from the collected data:

Media (general) example: "TV, overheads, computer, DVD, video, projectors, CD, stereo"

Digital only examples: "Anything I can do as far as computers"
" technology is computers and digital video in the classroom"

Tools example: " an extra resource"

Integrated example: "aiding students into finding information and using it in the classroom as well"

What are the teachers' perceptions of their uses of technology in the classroom?

Teachers described their use of technology both in the survey and in the interviews. The table below demonstrates that on questions relating to "Teacher's Use of Technology" the mean is generally close to the center with a standard deviation of one. Apparently most teachers modestly agree that they are using technology. The scores lower slightly when the questions start to refer to more complex applications of technology in learning. Examples of these questions are those about collaborative learning (Q14), about promoting "higher-level" learning (Q13), about addressing diverse

learning needs (Q16) and about curriculum-based interdisciplinary uses (Q17). The results of these higher-level technology use questions show that in those areas the teachers are less sure of their technology use. On a more general level and understanding of technology use the teachers appear to feel as though they are using technology in their classrooms more often than not. The differences between the technology use survey responses might also be revealing that the teachers' preparation in the laptop initiative has raised their awareness about teaching with technology and their expectations of their own technology use are now higher. The table below lists the means for each of the questions related to technology use.

Table 23: Descriptive Statistics on Technology Use

Survey Question	N	Mean	Std. Deviation
4) Students are involved in learning activities using technology.	65	3.77	0.996
5) Students are using technology to learn/for learning.	64	3.89	0.737
6) Students are involved in technology-related learning activities requiring peer collaboration.	64	3.11	1.086
7) Students are involved in technology-related learning activities requiring higher order thinking skills.	63	3.22	1.069
8) Students are using technology for learning as a tool for communication, production, and research.	64	3.31	1.125
9) Students are involved in authentic, self-directed learning activities involving technology.	64	2.97	1.140
10) Students surpass the school's expectations for technology skills for their grade and stage of implementation of the technology plan.	64	2.69	0.906
12) I integrate technology into at least some of my teaching.	61	3.46	1.219
13) I develop and implement technology-based learning experiences that promote higher-level learning for the students.	61	2.70	1.216
14) I develop and implement technology-enhanced learning experiences that promote collaborative learning.	60	2.00	1.008
16) I use technology to address the diverse learning needs of the students.	60	2.85	1.471
17) I am engaged in creating curriculum-based, interdisciplinary, and technology enhanced learning experiences for their students.	60	2.58	1.381
19) I am experimenting with new instructional strategies as a result of my use of technology.	60	3.22	1.195

What type of access to technology do the teachers perceive to be available for their instructional use?

For the most part teachers reported reasonable levels of access to technology. The questions in the table below are those identified as being related to teacher's access to technology. The teachers appear to feel positively overall about their access to technology. This feeling is also reflected in the interviews where most teachers reported

having computers and computer labs available. These teachers did not describe access barriers to their use of technology in their teaching.

Table 24: Descriptive Statistics on Technology Access

Survey Question	N	Mean	Std. Deviation	Question type
21) I would agree that a wide variety of technology resources (computers, scanners, digital cameras, software, etc.) exist in the school at which I work.	59	3.6	1.3	5 point scale
22) I would agree that technology resources in the school at which I work are available for just-in-time teaching experiences, whether through a checkout or by networking.	59	3.3	1.2	5 point scale
23) I would agree that technology resources are kept in operational order.	58	3.7	1.1	5 point scale
24) I would agree that technology resources are allocated for maximum use.	59	3.2	1.1	5 point scale
25) I would agree that technology resources at the school in which I work are accessible beyond school hours.	59	2.9	1.1	5 point scale
36) School/district leaders support continuous professional development opportunities for improving teaching and learning with technology.	60	3.9	0.7	5 point scale
49) Internet access and download speeds are sufficient for current instructional practices at my school.	59	4.0	0.9	5 point scale
50) Overall I feel as though I have on-demand access to technology at my school.	58	3.7	0.8	5 point scale

How do these teachers perceive their technology role in the school?

The teachers described their roles in the school in very interesting ways. While one might expect a first year teacher still to be finding his or her place in the school environment, these new teachers reported being sought out by other teachers for help fixing technology. My favorite example is from an early interview with LH during which

she described a time when a teacher asked her to share how she made a classroom management tool on the computer.

> LH: I had typed up all of my report card information with the name and the school and all that stuff you have to write on the report cards, so that I could just feed it though my printer and change the name of each kid every single time. And I asked (another teacher) if she wanted that on her computer. She said, you can do that? I said, yeah. And so I went to her computer and there's those black eMachines or whatever that have that flap in the front covering up the USB port. And I flipped it open and she screamed bloody murder, like I took the front of her computer off. She's been teaching there for ten years. She probably hasn't had the computer ten years, but she's had the computer for a while. Had no idea that you could open up that little front panel.

Teachers also describe offering an idea to other more experienced teachers on their team, and those teachers reacting positively to the suggestions. One teacher (KQ) described how the school had an idea that they could do their year-end scrap-books as a DVD, but no one had the skills to do that until she came. Now she is closely involved in leading a school-wide project in her first year of teaching. Another teacher (SQ) tells how she chose to be on the technology committee for her grade level, putting her in a position to share the newest technology ideas with the entire school.

What resources do the teachers perceive are available when they need help with technology in their classrooms?

All of the teachers in the interviews, except for the pre-k teacher in a non-profit organization, reported very quick responses to their technology needs. In the survey, question number 43 asked if there was support staff to help with hardware and software issues and question 45 asked if there was support staff available to support a teacher's integration of technology with the curriculum. While the teachers overwhelmingly reported that help with hardware and software issues is not an issue for them, it seems

that they are less supported with designated staff to help with technology integration. The table below shows the frequencies of responses to those two questions.

Table 25: Frequencies of Survey Questions 43 and 45

Q43- Is there support staff available to help with technology hardware and software issues?			
		Frequency	Percent
	Yes	56	94.9
	No	3	5.1
	Total	59	100.0
Q45- Is there support staff available to support integration of technology with the curriculum?			
		Frequency	Percent
	Yes	38	64.4
	No	21	35.6
	Total	59	100.0

How do the teachers perceive the school culture's openness to technology integration ideas and activities?

The teachers in the survey reported fairly positively on the openness and supportiveness of their schools to technology ideas. The factor analysis identified that the questions shown in the table below related to organizational support. These questions were all on a five-point scale and the results indicate that the respondents were generally positive. The strongest of these, question 33, stated that: "School leaders routinely use technology resources in their day-to-day school activities for operating the school." The overwhelmingly positive response is encouraging in that these new teachers are finding upon graduating that schools are themselves are embracing technology. The weakest response to these questions was on number 51 which stated: "Overall I feel as though students have on-demand access to technology in my classroom." Many teachers appeared to be unsure about this question, and that might come from the multiple ways in which it could have been interpreted. A teacher might think that the question could be

asking whether teachers allow access whenever the students request it, or it could be asking whether technology is available for the teacher's needs when he or she needs it. Greater clarity might have improved the results of this question.

Table 26: Descriptive Statistics on School Culture's Openness to Technology Integration

Survey Questions	N	Mean	Std. Deviation
26) I would agree that a plan for technology integration exists.	59	3.6	0.8
27) If there is, as far as you know, a technology integration plan, school leaders support the plan.	59	3.8	0.7
28) School leaders have designated personnel to support technology integration.	60	3.9	0.8
29) School leaders approve purchase and use of resources needed for supporting technology integration.	58	3.8	0.8
30) I would agree that an evaluation plan is used to improve services to support technology-enhanced teaching and learning.	60	3.4	0.9
31) District leaders advocate that school leaders be users of technology.	60	3.8	0.8
32) School/district leaders participate in activities to improve their skills as technology leaders.	60	3.6	0.8
33) School leaders routinely use technology resources in their day-to-day school activities for operating the school.	58	4.2	0.7
34) School leaders initiate ideas for technology use, review ongoing applications, and encourage staff to gain new skills in using technology resources.	60	3.5	1.1
35) School/district leaders are following policies on equitable availability and use of technology.	60	3.6	0.8
39) School leaders include the use of technology effectively as an integral part of the staff evaluation process.	59	3.3	0.9
47) I have sufficient professional development and support from the school to successfully integrate technology into my instructional practices.	57	3.3	1.0
51) Overall I feel as though students have on-demand access to technology in my classroom.	59	3.1	1.0

In general the positive response towards organizational support is consistent with the sentiments expressed during the interviews. Teachers, even in their first year, described sharing ideas, helping other teachers, and even serving on technology committees. Teachers mostly appeared to interact within their teams, and their teams, as seen in the two excerpts below, do seem to be extremely supportive of their ideas.

> WI- We'll plan together everything. And we'll share videos, we'll share ideas for things you can look up online, we'll share websites.
>
> LH- I'm working with a lot of really seasoned teachers that are really great, have a lot of really great ideas. And they'll say something like, we want to teach this and we have this activity to go along with something, because we don't have any ideas. And I'll get on the Internet and in two seconds have like a thousand activities, or information to put into a PowerPoint, or whatever.

How prepared do the teachers feel their technology-rich College of Education program made them for integrating technology in their classrooms?

In the table below are the five survey questions, 52-56, that related to the teachers' College of Education experience. Questions 52 and 55 ask whether the graduates felt prepared for integrating technology in a classroom when they first graduated from the ----------, and then, if now that they are in their first year of teaching they feel that they were well prepared by the (University of Teaching) for integrating technology in their classrooms. While almost 72% reported feeling prepared to integrate technology when they first graduated, after teaching for some months only 55% reported feeling prepared to integrate technology. Perhaps after several months of teaching the graduates have begun to discover the complexities of integrating technology with instruction and now feel that they were less prepared than they originally thought. Only with first hand knowledge and experience in applying their technology skills did the novice teachers begin to become aware of where their technology knowledge and skills

were lacking. This too points to a development of the teacher's technology-pedagogical content knowledge. As they begin to apply their technology skills to teaching and content they are more aware of what they need to know for those specific situations. This is reflected in some of the comments made by teachers in their interviews when they describe how through the laptop initiative they learned technology, but through teaching they learned how to put technology and teaching together. While several teachers referred to this, one teacher put it very well:

> MP- I think UT taught me a lot of technology and some technology in teaching. But the thing about teaching that I realized this year is that you really have to do it a lot. You can learn a whole lot, but you also have to do it. And I learn through the experience of doing it. I feel like actually having crafted incorporating technology, each time I kind of learn a little something, that that worked, or that didn't work, or I'm definitely going to do that again.

Questions 53 and 54 asked the teachers from where they felt their skills using technology in the classroom came, whether how they use technology in the classroom came from their College of Education experience or from what they already knew about computers before entering their CoE. 48% responded that they felt as though how they use technology in the classroom came from their College of Education experience and 62% responded that they felt as though how they use technology in the classroom came from what they already knew about computers before entering their CoE. It is interesting that out of the graduates there arose these two dichotomous opinions regarding how the CoE experience impacted how technology is used in the classroom. It could be that some of the teachers sensed that learning to use technology in the classroom comes after using technology in the classroom and discount what was learned during their CoE experience as having influenced that. It could also be indicative of different learning styles in

relation to technology use. Clearly, the factors that could influence the responses to this question are many. 35% percent of the graduates reported they wished they were taught something in their CoE experience which they were not, a study exploring the possible factors influencing this group of questions would help guide CoEs to create more meaningful learning experiences for their students.

Table 27: Descriptive Statistics on Survey Questions Relating to the College of Education Experience

Q52-I felt prepared for integrating technology in a classroom when I first graduated from -----.		
	Frequency	Percent
Strongly Disagree	4	6.7
Disagree	7	11.7
Unsure	6	10.0
Agree	28	46.7
Strongly Agree	15	25.0
Total	60	100.0
Q53-I feel that the way that I use technology in my classroom came from what I was taught about using technology in a classroom by my college of education.		
	Frequency	Percent
Strongly Disagree	11	18.3
Disagree	16	26.7
Unsure	4	6.7
Agree	21	35.0
Strongly Agree	8	13.3
Total	60	100.0
Q54-I feel that the way that I use technology in my classroom came from what I already knew about using technology in a classroom before starting the LIFE program at my college of education.		
	Frequency	Percent
Strongly Disagree	0	0
Disagree	6	10.0
Unsure	17	28.3
Agree	30	50.0
Strongly Agree	7	11.7
Total	60	100.0
Q55-Now that I am in my first year of teaching I feel that I was well-prepared by the ---------- for integrating technology in my classroom.		
	Frequency	Percent
Strongly Disagree	4	6.7
Disagree	9	15.0
Unsure	16	26.7
Agree	24	40.0
Strongly Agree	7	11.7
Total	60	100.0
Q56-I wish that in the EC-4 program I was taught something that I was not taught relating to technology in the classroom.		
	Frequency	Percent
Strongly Disagree	1	1.7
Disagree	27	45.8
Unsure	10	16.9
Agree	15	25.4
Strongly Agree	6	10.2
Total	59	100.0

The second research question, "How do beginning teachers who have been in a ubiquitous computing environment connect technology and teaching in elementary school classrooms?" also contained sub questions to guide the exploration of the question. Each of those sub questions are now addressed in turn.

How do the teachers approach lesson design when technology is involved?

From what I have already explored, it appears that the teachers either think about technology as an extension or as an integral part of the lesson. With more participants it would be interesting to see what types of relationships lie within these distinctions. From this study what I see is that the teachers can add technology into a lesson, replacing similar resources and activities from a more traditional approach, for example replacing research in the library or in encyclopedias with research on the Internet. I have also seen that, if planned from the lesson's inception, the technology use tends to be more interwoven and indispensable to the learning experiences.

What non-teaching activities do they partake in at the school that relate to technology?

From the interviews there appeared to be four categories of non-teaching activities. Class management, such as typing up and printing handouts, or preparing report cards was an expected category, but the other three were more of a surprise. Sharing ideas, functionality help, and computer trouble-shooting help were the three other categories. Some teachers are sharing ideas such as KM- "I have talked to them about United Streaming and about having wireless" or WI- "If I make my own PowerPoint I'll share it with them or something, and I'll share what I do." Other teachers

described sharing their knowledge of the functionality of programs such as LH's experience with teachers in her school coming to understand how to use PowerPoint:

> LH—There's someone in my classroom probably three or four times a week saying something like, "well I know how to use Powerpoint, but how do I make it do this?' or like ' can you help me get logged into this?"…I mean, it's fun.

The last category mentioned is that of a technology trouble-shooting resources. According to DG, she has "been able to help other teachers when they need help problem solving and problem shooting and stuff like that". BC described the extent of this trouble-shooting when she explains that "they sometimes ask and sometimes I can't fix things. I had fixed a couple of things that I knew how to do…I think I just had more exposure and experience with these kinds of software".

What resources do they reach out to when they need help with technology in their classrooms?

The problems that the teachers had with technology during the interviews and journal writing were overcome either on their own or with the help of other teachers. The problems were mostly ones of logistics and time, and while bothersome did not prevent the teachers from developing and carrying out their lesson. One teacher complained about the TAKS exam preparation taking up so much time that there was no time for anything but TAKS preparation for the first semester. Some of the most interesting data to come from these concerns are the statements made by the teachers on what they learned from the challenges related to integrating technology. In this section, SQ, a first grade teacher, described what she has encountered as a teacher taking her young students into the computer lab, and how she has learned from the experience:

> SQ-The most difficult part of lab time is keeping them all under control and quiet enough that they would listen. During student teaching, I never saw a first grade class in the computer lab, so this has definitely been a learning experience. During this first lesson, I warned the students that next week we would be creating and printing a picture that we would be writing about. They watched me teach them how to make backgrounds, stamps, and animations. Logging in and out is quite a process for first graders. I usually have to allow about 10 minutes for each. They are not used to the underscore. Next year I plan to put a keyboard picture printout poster on the wall highlighting important keys. At our school Kindergarten doesn't used computers often so this is new to many of them.

Other teachers are still trying to come up with their solutions. The following excerpt comes form the journal of BC:

> BC- the other day, my team had picked a short video on united streaming about Martin Luther King. My mentor had shown it to her class and said it was great and the kids really liked it. During my planning time, i downloaded it and got it all ready. Everything was ready to go. Once the kids were in the room, i got it ready to be on the t.v. We started watching the video and everything was going great. all of a sudden, in the middle of the video, it stopped playing and i couldn't get it to start again without starting over. i felt extremely frustrated because the kids were only able to see half of it and it was very informative and they were all listening. sometimes with technology, you just never know what is going to happen. i am feeling a little apprehensive now about united streaming because i would be really mad if that happened again, because it upset the learning process.

In the journal excerpt below BC again faced frustration, this time trying to get her first grade students logged-on to a program on the Internet called Learning.com. In reading this excerpt I believe BC sees the benefits of technology and will keep trying to make it work for her and her students.

> BC- by the time i got them all on the start page, we had used about 20 minutes of our computer time which was annoying! but i will admit, once they got started there was this overwhelming silence all of a sudden. they were all engaged and starting to learning basic mouse skills and keyboard skills. in the end it was worth it and i hope the getting ready part goes better next week!

UL, a fifth grade teacher, lamented the loss of flexibility to use technology due to preparing for the TAKS statewide achievement test but did still refer to several instances of using technology as a resource. One example is given below:

> UL-Unfortunately I was unable to really use technology in my lessons as we were spending most of the week preparing for the reading TAKS test that took place on Feb. 21. We were, however, doing a science project discussing types of consumers and examples of herbivores, carnivores, and omnivores. Students were asking me if their animals were examples of each, so the students and I got on nettrekker.com and looked up the animal and its diet. Students continued to ask me if they could look up their animals too, so I let the students get on the computer 6 at a time and research their animals.

In the three examples given above it is apparent that despite the hindrances these teachers face using technology in their teaching, they are still trying. They are seeing the benefits of technology and working to find solutions for the barriers. These teachers persevere.

INTEGRATING THE ANALYSIS

Applying technology-pedagogical content knowledge to the examination of technology use by first-year teachers offers a useful framework for understanding the way in which technology is used by teachers, on the challenges faced by first year teachers in their attempts to integrate technology, on the College of Education programs preparing the teachers, and on the construct of t-PCK. The following sections provide a synthesis and interpretation of the major findings yielded by the study.

How teachers are using technology

This study employed both qualitative and quantitative methods in order to gain both a broad understanding and a specific picture of how teachers use technology. In the interviews and journals, descriptions of how technology was used in lessons added a specific richness to the quantitative understanding gained through the survey. The teachers were asked to think aloud as they planned a hypothetical second grade lesson on butterflies. The results were coded by where in the lesson the teachers described using technology (beginning, middle or end) and how integrated it seemed to be into the central fabric of the lesson they were describing. The three approaches to lesson design with technology that emerged from the interviews included: 1) when technology is used at the end of the lesson, it tends to be used as a way to present student work; 2) in the middle of the lesson it was often used as a research tool; and 3) when integrated throughout the lesson design it was intertwined such that the entire lesson would have to be rethought if the technology was removed. Both spontaneous and planned extensions of classroom lessons were seen in the journals, as well as lessons in which technology was integrated with the content in the same way as item 3 above.

That teachers approach technology use in different ways is also supported in the survey data. 75% of the surveyed teachers report that students are involved in learning activities using technology and 85% report that students are using technology to learn or for learning. However, when asked if their students were involved in higher order thinking activities 47% agreed and only 40% agreed that their students were involved in "authentic, self-directed learning activities involving technology." These data indicate that teachers are not creating environments in which students are able to participate in

self-directed, higher-order thinking activities. The different approaches to the use of technology in the classroom could be indicative of teachers who are at the beginning of their career, relying on classroom techniques that center on the teacher. Alternatively, they could also be pointing to the possibility that while most respondents could say that students are using technology for learning, only those who perceive of technology as an integrated part of curriculum might feel as though their student's learning activities were self-directed learning activities involving technology.

In the teachers' comments four concepts of technology emerged. When asked to define technology in the context of schools, the teachers' responses could be categorized as using either: 1) only digital-media examples and descriptions such as computers, the internet and software, or 2) a general media approach including examples from all media types such as overhead projectors, computers, audio tapes, and intercom systems. In addition to this division, the responses could also be divided between those that described technology as something inherently integrated with the curriculum or those who describe it less integrated and more as a resource or a tool, separate from the curriculum. The following examples of each category come from the teachers' responses of what is technology in the context of schools.

General Media example: "Technology is TV, overheads, computer, DVD, video, projectors, CD, stereo"

Digital only example: "Anything I can do as far as computers"

" technology is computers and digital video in the classroom"

Resource/Tools example: " an extra resource"

" to me technology in the classroom is an electronics or other tool based means of distributing information or accomplishing a task"

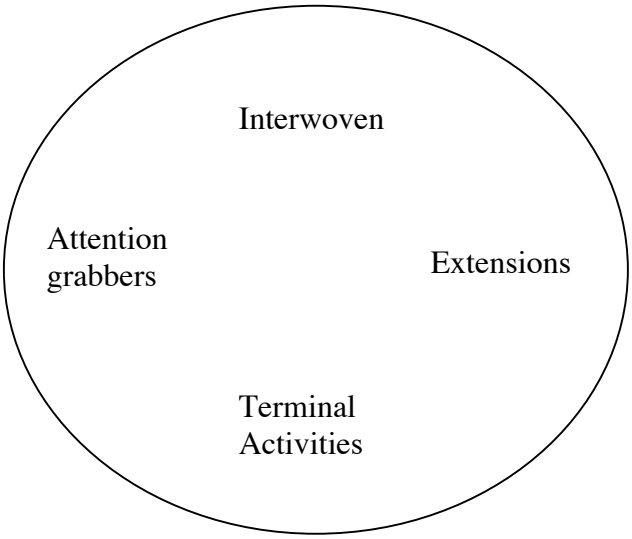
Integrated example: "aiding students into finding information and using it in the classroom as well"

On further analysis it became apparent that teachers who spoke of technology in digital-only terms were more likely to have mentioned integration in their description than teachers who spoke of technology in general-media terms. Those who used general media terms were instead more likely to have described technology use as a tool or resource. It was evident that there were two different ways that teachers thought about technology in a school context: those who saw it as related to digital technology and as something to be integrated with the curriculum, and those who saw it as any way to convey information and as something to be used as a tool to support the existing curriculum.

This examination of technology use provides another way to interpret the variation between the high 85% of respondents claiming to use technology with their students for learning experiences, and the lower 47% using technology for higher-order thinking activities. Many teachers are using technology as attention grabbers such as short digital movies downloaded from the Internet, or as terminal activities such as typing up a report on the computer, but not in the roles that lend themselves well to self-directed learning activities or higher order thinking skills as do well-planned extensions or activities interwoven with the curriculum.

The following diagram illustrates the types of technology uses identified by the novice teachers in the study. The circular nature of the diagram is intentional to avoid implying that one type of technology use was more valuable than another.

Figure 8:Technology Use Diagram



Challenges to technology use

After technology skills, the two main barriers to technology use are: 1) access to technology, and 2) organizational support of technology use. Composite variables were created on access and organizational support, with means of 3.5 and 3.6 respectively. In the interviews and journals only one teacher, the pre-kindergarten teacher working in a head–start program, reported any issues with lack of access to technology. Yet only 75% of the survey respondents agreed that students are involved in learning activities using technology. Since it was evident that generally accesses to technology and support for the teachers to use technology were both good, what challenges did the teachers face?

Two challenges reported during interviews were time and management. The teachers of students in younger grades reported finding challenging how to manage their littlest students in a computer lab. The teachers of students in older grades reported the challenge lies in how to make time, in a high-stakes testing world, for non-TAKS related activities. To see just how wide spread this was, I returned to the survey results to examine the responses on time and management. While not addressed directly, there are two questions related to this issue. On the issue of being able to manage a class learning about computers, one survey question asked whether there is " staff available to support integration of technology with the curriculum." The results demonstrated that while 64% said yes, those who identified this staff often described them as another teacher at the school designated to help, hardly someone with the time to spend working on classroom management for technology integration. There is no direct survey question addressing the issue of time, however, question 51 asked whether students "have on-demand access to technology" in the classroom. More time to spend on technology could lead to more on-demand access to technology. 47% agreed or strongly agreed that their students did have such access. It is possible that in the younger grades teachers might not want to give younger students that type of freedom in the class. To eliminate this possibility from the responses I examined the results by grade level. The results showed that when the question was examined by looking at the teachers who reported teaching in third, fourth or fifth grades, the results stay almost unchanged at 50%. This points to a previous supposition that there could be confusion in the wording of this particular question. The results of this study indicate that there is a high percentage of technology use, providing the opportunity for the new teachers to learn through their experiences and to develop

t-PCK. However it is also important to understand the major barriers confronting novice teachers in this endeavor. The two major barriers reported by teachers related to time and management; and there was evidence that the traditional barriers to technology use are being replaced by time and management issues. In further iterations of the survey it would be wise to include questions directly relating to issues of time and management in the classroom integration of technology to more clearly explore the current barriers to technology use.

The College of Education

One purpose of this study was to examine whether teachers who have graduated from the laptop initiative do use technology in their teaching. As a result the study has the dual purpose of not only examining the teachers' perceptions of, and reported uses of technology, but also their perceptions of the extent to which the college of education experience prepared them to integrate technology.

Some of the first interviewees stated that they did not believe they learned much related to technology from their College of Education (CoE), rather that they knew that information before beginning the program. The survey asked several questions directed towards how the teachers perceived their experience at their College of Education. Two questions asked the teachers whether how they use technology in the classroom came from their CoE experience or from what they already knew about computers before entering the CoE. Almost half reported each way. Thirty-five percent of the graduates indicated they wished they were taught something in their CoE experience which they were not taught. 65% of those who responded that they felt as though something was missing from their CoE experience, described what was missing as something that could

be grouped into the category "integrating technology into daily practice as a teacher." In the second interviews teachers were asked whether they felt as though their CoE experience taught them technology for teaching, or just technology. The responses were fairly divided with some teachers quickly responding technology alone and others describing technology for teaching.

To explore the apparent division in the teachers' views of what their CoE experience taught them, I returned to the survey data. Several of the teachers described a particular professor as successful in teaching technology for teaching. I took the composite variable "teacher's use of technology" and examined it according to cohort membership. The results showed that no one cohort reported substantially greater technology use than the others, their mean scores all fall in a range of 2.8-3.4 on a 1-5 scale. However, the cohort with the highest mean score (3.4), was led by a professor with added experience in the laptop initiative due to his participation in the pilot. This raises the possibility of whether, as the program matures and the professors gain experience teaching in it, the outcomes in new teacher ability to integrate technology with teaching will also increase.

T-PCK

Technology-pedagogical content knowledge (t-PCK) is a teachers' professional knowledge combining an understanding of a subject, of how that subject is best presented, of how students of a certain age learn the subject, and of which technology is best suited for that subject and those learners. Technology-pedagogical content knowledge develops, as does pedagogical content knowledge (Grossman, 1990), through experiences with technology as a student and as a teacher. The preceding sections each

demonstrated how, through both experience as a student and as a teacher, the teachers in this study have had opportunities for their t-PCK to develop. The results have indicated that there is a high percentage of technology use, providing opportunities to learn through technology experiences, and to develop t-PCK. However, it is also important to understand the major barriers confronting novice teachers in this endeavor. The two major barriers reported by teachers in this study were related to time and management. The time and management issues faced by new teachers are issues that they appear to approach as a challenge, and with their t-PCK, work towards overcoming.

The survey asked several questions that could be used to evaluate a person's t-PCK. The following three questions are examples of such questions. "I integrate technology into at least some of my teaching," to which 49% agreed or strongly agreed, "I use technology to address the diverse learning needs of the students." to which 28% agreed or strongly agreed, and "I am engaged in creating curriculum-based, interdisciplinary, and technology enhanced learning experiences for their students." to which 19% agreed or strongly agreed.

Combining the phase one survey data, and the phase two qualitative data, a picture begins to be seen of teachers who have developed enough t-PCK to know how much further they have to learn as teachers. The interviews and journals revealed teachers that are growing in their knowledge of how to integrate technology with their grade level curriculum and the surveys revealed teachers that have demonstrated more than a little knowledge on the intersection of technology, pedagogy and content. It is through an understanding of what is really involved in teaching with technology that these teachers are able to know that they still have much to learn. A teacher without such a strong

understanding of how technology and higher-order thinking, for example, go together, might be more likely to claim greater technology use. These teachers are demonstrating t-PCK by showing that they are aware that they still have more to learn. They were trying new ideas, thinking about how to make lessons enriched by technology experiences, and reflecting on how to integrate technology more in the coming year. Their experiences teaching with technology, a result of their existing t-PCK, were, in turn, expanding their t-PCK. This cycle of growth could only happen with a strong foundation and in an environment fostering the growth of their knowledge and skills related to teaching with technology.

Chapter 5: Discussion and Recommendations

If you find a path with no obstacles, it probably doesn't lead anywhere.

--Henry Wadsworth Longfellow

DISCUSSION

Summary of the Study

This study examined the technology perceptions and experiences of new teachers who had graduated from a teacher preparation program with a laptop initiative. The teachers were required to purchase a laptop at the beginning of their three-semester professional development coursework, and the professors in the College of Education were encouraged to incorporate technology as appropriate into their instruction. Mid-way through the teachers' first year of teaching they were asked to participate in a survey on their technology use and to share their perceptions of how their College of Education experience had influenced that use. Ten of those teachers were selected to participate in the second phase of the study involving interviews and journal writing. The framework of a teacher's technology-pedagogical content knowledge (t-PCK) was used to frame this study. The use of the t-PCK framework allowed the teachers' technology use to be viewed as a part of their professional knowledge. How that knowledge was supported and developed became a recurrent theme in the analysis of the data. The analysis showed that teachers did not identify major impediments to accessing technology. It also showed that the new teachers are integrating technology moderately, and that other teachers they work with tend to be open to their ideas for using technology in instruction. In addition,

the analysis showed that teachers tend to think of technology as either computer technologies to be integrated in their instructional practice or as tools for communicating content. Most interesting perhaps are the results demonstrating that teachers are growing in their understanding of how to apply technology to their teaching even during their first year when they are typically overwhelmed. It is the experience of using technology, together with content and teaching method, that begins to enhance the way technology is utilized in a classroom. This would lead one to believe that technology-pedagogical content knowledge, t-PCK, is what teachers draw upon when integrating technology with instruction.

Discussion of the findings

The research questions asked in this study were how do new teachers perceive of and use technology in their classrooms. This study began with an awareness of the typical barriers faced in technology integration, an overview of the history of technology preparation for teachers, a look at teacher development, and an understanding of the interaction that must occur between what a teacher knows about technology, student learning, and content matter. That interaction I have called t-PCK (technology pedagogical content knowledge) after Niess (2005) and it led to the examination of how teachers perceive they are using technology.

I will begin this discussion by reporting that the teachers in this study are using technology in their classrooms. While seemingly obvious, this is rather impressive compared to how the first year of teaching is traditionally perceived. Many researchers have described teacher development as it progresses from student teacher through experienced veteran teacher. Fuller and Bown (1998) described teacher development as a

shift in the teacher from a focus on their own survival in the classroom to a focus on what is best for student learning. Bullough and Baughman (1997) described teacher development as shifting from the teacher being a "follower" during his or her first teaching experiences and on to an "independent/master" in his or her fourth year. These models describe the first year as a place where personal innovation in teaching is not expected. In contrast, in this study teachers found many places to integrate technology, and not just in the ways expected from novice teachers. Their technology expertise enabled them to be more than followers in the school context but to be recognized and valued for their technology expertise. The teachers described developing ideas originating from either their CoE experience or from the schools where they teach, and applying these in their classrooms. In addition, I found the teachers expressing that they have grown in their technology use since the beginning of the school year. They described finding more opportunities to integrate technology and developing ideas of how to incorporate technology in the coming school year. In one journal, WI discussed an activity she thought of while watching her students in the computer lab, and how she could incorporate it in her lessons next year:

> WI- Another thing we studied this past week was rocks and soil. We went to the lab and the children were able to explore with all different types of rocks. I did not get the chance to do this, but I did think how next time (maybe with a higher level grade) it would be good to have children research their favorite rock and present their information to the class. Even if I cannot do this with all of my students, then maybe for my higher-level ones. I realized that the internet and other programs are a great way to extend lessons for those who need more challenge in the classroom.

Hall and Hord (2001) discuss the Stages of Concern Model which describes that when an innovation is being adopted there is a path to the focus of concern an individual

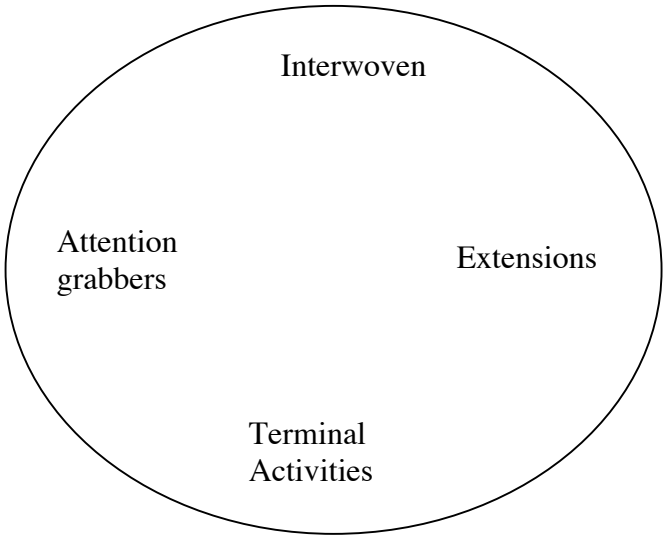
is going through at any particular time. They identified seven stages of concern, 0-6. The earliest stages (0-3) are awareness, informational, and personal, stages during which the individual is concerned about how the innovation will affect their own activities. As the innovation, in the case of this study using technology in instruction, becomes more comfortable and common to the individual, his or her concerns turn more to the impact of the innovation. The highest stages, 4, 5 and 6, focus upon consequences of the innovation, collaboration with others on the topic of the innovation, and refocusing the innovation towards broader purposes and benefits. In this study the teachers are collaborating and refocusing, activities at much higher levels of innovation adoption then would be otherwise anticipated from novice teachers. The data from this study have indicated that the technology integration of the participating teachers extended beyond what might be expected in the first year of teaching and was setting the base for further technology planning and implementation during the coming school year.

In the interviews participating teachers were asked to describe their technology use. Teachers who described technology that required an application of pedagogical content knowledge (t-PCK) also described their technology as integrated with instruction. This suggests that when technology, content, and pedagogy come together, technology integration is often the result.

The lessons described by the teachers in this study expressed various forms of technology integration. It would be tempting to say that "interwoven" is a more advanced design state of technology use than "extension." However, it is important to remember that there are other factors besides technology that a teacher must take into consideration when designing a lesson. The needs of the learners, the content, the

learning context and the available technology should all be included in any examination of whether a particular lesson design choice was the most appropriate available. For the purposes of this study it will suffice to observe that teachers designed technology into their lessons in one of four categories.

Figure 9: Technology Use Designed by Teachers in this Study



The goal of the laptop initiative from which these teachers graduated was that "All students in the … teacher preparation program will be prepared to enhance their students' learning in technology-rich classrooms" (UT_CoE, 2005). From the data gathered in this study it seems that the CoE has made substantial progress toward achieving this goal.

While the teachers all reported various degrees of technology integration, several of the teachers participating in the interviews did not feel that their CoE experience explicitly prepared them to teach with technology. It is difficult to separate the skills gained from exposure to technology in the CoE experience from "teaching" focused technology lessons. One participant described this well when she said, "the things that

they did show us, I guess it was kind of obvious how to do it in your teaching" (LH). Despite her belief that it was "obvious," some cohorts showed greater technology use than others indicating that there was something different about those cohorts. While all cohorts were required to purchase the same equipment and take the same courses, different cohorts did have different professors and different student teaching placements. What factors may be involved in the differential use of technology by graduates of different cohorts, and which factors are then the most important in impacting the use of technology, are still unclear.

The goals of the laptop initiative experienced by participants in this study were limited to topics that a CoE can influence. A CoE can prepare teachers to use technology to enhance their students' learning, but it is beyond their realm to ensure that the teachers will have the tools and support to do so. There are barriers to technology integration beyond the scope of a CoE. Slightly more than half of the graduates felt that they were well-prepared by the (University of Teaching) for integrating technology in their classrooms. Some teachers participating in the second phase of the study indicated that the development of their skills integrating technology with teaching did not occur until they were in their first year of teaching. Those same teachers also indicated that the schools where they taught during that first year were supportive of technology integration. The teachers expressed very few access related barriers to technology and a large amount of support from their administrators and fellow teachers. Their skills integrating technology with teaching, at least partially, came from the influence of these technology-supportive schools where they were teaching.

However, while barriers such as technology access were not experienced, the teachers did experience other barriers. Time constraints has been well-researched as a

barrier to technology integration (Peck, Cuban, & Kirkpatrick, 2002a, 2002b). In this study, often related to the demands of standardized testing, a lack of time was reported as a frustrating barrier. The need to prepare students in the test-taking environment is apparently consuming time that could otherwise be spent on creative, technologically integrated, learning experiences. Teachers of older students were frustrated by the lack of time available in their schedules to use technology, particularly expressing that particular technologies would be useful in raising the performance level of their students.

> LH- We spent A Lot (stress is hers) of time going over a TAKS writing practice that we should have done a better job on. I would have been nice to direct teach this with the remote control system question by question instead of correct teach it three days later.

A particular challenge for the novice teachers working with younger students was the shorter attention spans and greater need for guidance that younger students have, especially when working with technology.

> SQ- With first grade I have kind of had a hard time because when they are on their own they are still trying to learn their first name so it is kind of frustrating having them learn how to login because it takes so long.

While teachers of upper-elementary grades reported time restraints tied to high-stakes testing as a hindrance, and teachers of lower grades reported frustrations attending to the needs of young children in a technology rich environment, the teachers were nonetheless continuing to use technology. In addition, it is encouraging that the teachers generally presented themselves as adequately equipped for integrating technology. Computers, Internet access, and a method of displaying the computer screen were available for their use. Both their disposition towards technology and their access and

support for technology put them in a position in which their t-PCK could grow and develop.

A recent survey at the University of Florida examined pre-service teachers' perceptions about technology use in education(Swain, 2006). The results of the survey indicated that the pre-service teachers were "not convinced that introducing this 'new' element into their daily lives and future teaching is necessary"(p54). In this study, to the contrary, teachers were using technology in their classrooms, despite the challenges they faced. Even when faced with challenges they did not stop using technology. Instead they planned how to design the lesson differently next time. Overall, the teachers in this study revealed a great amount of tenacity.

There are two main differences between the teachers in this study and the students in the Florida study. One difference is that the teachers in this study had already graduated and were working in schools where technology use is both valued and supported, reiterating the importance of the supportive school. The other difference is that the teachers in this study have completed a program where technology use was modeled in instructional situations, highlighting the possible relationship between professor and technology use, a connection that still needs further examination. In the survey out of the University of Florida, Swain explained that her students were not supporting the need for technology in the classroom because they themselves were not taught with technology in the classroom. She described this as reminiscent of the common adage that "teachers teach as they were taught." In contrast, the teachers in this study were taught with technology. Like those in the Florida study, they are teaching as they were taught.

This study has shown that, given a supportive school environment and a foundation where technology integration has been modeled, new teachers will integrate technology into their teaching. In addition, the new teachers expressed a commitment to continued growth of their technology integration skills.

Shulman (1987) identified four sources of PCK: content knowledge, school resources, pedagogical knowledge, and "the wisdom of practice itself" (p 8). Van Driel, Beijaard, and Verloop (2001) later identified teaching experience as the central factor in the development of PCK. In this study I have expanded PCK to t-PCK, and explored how new teachers approach and perceive of teaching with technology. I found that it is the combination of their CoE experience and their experience teaching in a technology-supportive school that provides teachers with the environment in which their skills to combine technology, content, and pedagogy develop. It is there that they perceive of, and use technology in manner that is both integrated and advanced for their first year of teaching.

RECOMMENDATIONS FOR FURTHER RESEARCH

In addition to Shulman(1987) and Van Driel, Beijard, and Verloop (2001), Grossman (1990) described four ways that PCK is developed. One of these, like Van Driel, Baijard, and Verloop, is classroom teaching experience. This study examined first-year teachers and as a result the findings of this study are limited by the amount of experience of the teachers. With more experience teaching, trying out different ideas, experiencing first hand what works and what does not with different types of learners, a teacher's PCK is given the opportunity to further develop. In a similar manner experience using instructional technologies in the classroom will provide the opportunity for t-PCK

to further develop. As the new teachers' t-PCK develops, the teachers see, understand, and can apply the learning benefits of instructional technologies; and in turn are more likely to search out opportunities to use them. If this is the case, then if the teachers in this study are followed out over the course of their second and third years of teaching, a greater and more effective use of instructional technology would be expected. A study such as this should examine what experiences lend most to the teachers' development of t-PCK and subsequently to changes in their use of technology in the classroom. Such a study would be a benefit to the research community, adding to the current understanding of t-PCK development.

This study identified four ways that teachers conceptualize of technology in classrooms: as integrated with the curriculum, as a tool, as general media, or as solely digital. Research instruments on classroom technology use are not always precise in their explanations of what types of technology use the teachers are reporting. A suggestion for further research is that survey instruments include very specific describers of technology (digital, general, etc) so that divergent responses are less likely to be collected.

Another limitation of this study is that it does not include a high number of participants. While 30% of the graduating teachers did respond, graduates were extremely difficult to locate. Additional research possibilities include tracking all future graduates of the same program. This would have two benefits. The first would be to compare the conclusions to another group, adding to the validity or raising new, previously unseen, concerns. The second would be to see if, as the program matures, and the professors gain more experience, the graduates become more proficient at using technology in the classroom.

Grossman (1990) expanded upon Lortie's 1975 description of the apprenticeship of observation, the image of teaching gained while a grade school or high school student, to include the influence of undergraduate coursework on the development of PCK. She discussed the development of PCK through subject matter classes taken by prospective secondary-school teachers. The apprenticeship of observation may also affect the development of t-PCK. In Swain's (2006) study, students' lack of support for technology use was attributed to their CoE experience. In addition to the apprenticeship of observation, Grossman identified professional education as a source of PCK. CoE methods courses that teach the practices of integrating technology with instruction are also sources to develop further a prospective teacher's t-PCK. As the professors become more adept with their understanding of the applications of instructional technology in learning and teaching, so might their students internalize those deeper understandings. The results of this study showed differences in reported levels technology use of survey respondents based on cohort membership. This study further raises the possibility referred to by both Grossman and Swain that there is a relationship between how a CoE course is taught and how the students of that course will one day teach. As the professors gain experience will these differences disappear? Will other areas arise? This is an area rich for further investigation and one that I hope to explore in the coming years.

Appendix

EMAIL TO BE SENT TO ALL POTENTIAL PARTICIPANTS

Dear UT College of Education Graduate,

I am a graduate student at UT working on my dissertation in education. I am interested in finding recent EC-4 graduates who were part of the laptop initiative to take part in a study during the Fall 2005 semester. The study, called the *Technology and Teaching Research Study*, will examine ways in which technology skills and knowledge you gained in your College of Education program are applied in your elementary classroom.

The *Technology and Teaching Research Study* will involve an online survey of approximately 30 minutes, being available for two interviews during the fall semester of about an hour each, selecting two technology rich lessons you would like to have observed, writing your own observations and reflections in a WebLog, and attending a focus group session with other participants in the study that will be conducted over dinner in a restaurant. Benefits of the study include adding to our understanding of technology preparation for teachers, as well as to the constraints and affordances faced by new teachers who have been prepared to use technology in classrooms.

The study is completely voluntary and you are free to choose to no longer be involved at any time. If you have any questions about the study please feel free to contact myself, Lisa Abate, at 300-6536, or my advisor, Dr Paul Resta, at 471-4014.

If you will be teaching in the Fall 2005 semester and are interested in being a part of this study please sign and keep this form for your reference and proceed to the following URL to take the technology survey.

http://www…..
The password is: teach

From the pool of survey respondents a group of teachers will be selected for participation. If you are selected I will contact you personally so that we may discuss and schedule your participation in the interview and observation portions of the study.

Thank you for your consideration,

Lisa Abate
Principle Investigator

2ND EMAIL TO REQUEST FOR PARTICIPATION

Dear _____,

We recently sent you a request to participate in a study examining technology use by new teachers recently graduated from the ---------- EC-4 generalist program. This study will be important in helping to understand not only what technology-related elements of you teacher preparation program have been most useful to you in the classroom, but also to understanding how to help new teachers in the area of technology.

Please take a few minutes and complete the survey, your answers could help a next generation of student teachers preparing for the classroom.

As a reminder the survey is available online at:

http://www…..

Thank you again for your part in helping us learn more about technology and teaching,

Lisa Abate
Principle Investigator

TECHNOLOGY AND TEACHING ONLINE SURVEY

Thank you for your interest in the *Technology and Teaching Research Study*. This survey should take approximately 30 minutes to complete. You are free to skip any questions that you find difficult to answer, but please do try to answer all that you are able to.

Please begin by first reading the statement below and answering accordingly:

I have read the consent form sent to me in a previous email, I understand that my participation is entirely voluntary and that I may withdraw my participation at any time.

⇒ Agree
⇒ Disagree

I **Teacher's Background**
We are requesting this information as a way to help organize the data. No identifying information will remain in the written version when it is made public.

1. Name (or pseudonym if you prefer) _____
2. Email _____
3. Male or female _____
4. Semester graduated for UT: semester _____ year _____
5. Cohort _____
6. GPA (can be approximate) _____
7. Minor in college _____
8. District teaching in _____
9. School teaching in _____
10. Grade teaching (circle one): PK K 1 2 3 4 5

Before we begin I would like to get a sense of what technology in relation to schools means to you. Would you please write what you think of when someone is talking about school technology:

II. Level of Student Engagement
Instructions: Select the word or phrase (strongly disagree, disagree, unsure, agree, strongly agree) that you feel most fits the statement above it.

1. Students are involved in learning activities using technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

2. Students are using technology to learn/for learning.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

3. Students are involved in technology-related learning activities requiring peer collaboration.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

4. Students are involved in technology-related learning activities requiring higher order thinking skills.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

5. Students are using technology for learning as a tool for communication, production, and research.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

6. Students are involved in authentic, self-directed learning activities involving technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

7. Students surpass the school's expectations for technology skills for their grade and stage of implementation of the technology plan.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

8. Students practice responsible use of technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

III. Environment for Teacher Engagement

1. I integrate technology into at least some of my teaching.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

2. I develop and implement technology-based learning experiences that promote higher-level learning for the students.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

3. I develop and implement technology-enhanced learning experiences that promote collaborative learning.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

4. I use authentic assessment to assess students' technology –related learning experiences.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

5. I use technology to address the diverse learning needs of the students.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

6. I am engaged in creating curriculum-based, interdisciplinary, and technology enhanced learning experiences for their students.
❑never ❑once a month ❑once a week ❑twice a week ❑daily

7. I ensure that policies and procedures for responsible use of technology are followed.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

8. I am experimenting with new instructional strategies as a result of my use of technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

9. I am actively involved in on-going professional development
on technology integration/infusion.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

IV. Availability and Accessibility of Appropriate Resources

1. I would agree that a wide variety of technology resources (computers, scanners, digital cameras, software, etc.) exist in the school at which I work.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

2. I would agree that technology resources in the school at which I work are available for just-in-time teaching experiences, whether through a checkout standalone mode or by a networking environment.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

3. I would agree that technology resources are kept in operational order.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

4. I would agree that technology resources are allocated for maximum use.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

5. I would agree that technology resources at the school in which I work are accessible beyond school hours.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

V. Organizational Support

1. I would agree that a plan for technology integration exists.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

2. If there is, as far as you know, a technology integration plan, school leaders support the plan.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

3. School leaders have designated personnel to support technology integration.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

4. School leaders approve purchase and use of resources needed for supporting technology integration.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

5. I would agree that an evaluation plan is used to improve services to support technology-enhanced teaching and learning.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

6. District leaders advocate that school leaders be users of technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

7. School/district leaders participate in activities to improve their skills as technology leaders.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

8. School leaders routinely use technology resources in their day-to-day school activities for operating the school.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

9. School leaders initiate ideas for technology use, review ongoing applications, and encourage staff to gain new skills in using technology resources.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

10. School/district leaders are following policies on equitable availability and use of technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

11. School/district leaders support continuous professional development opportunities for improving teaching and learning with technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

12. I would agree that professional development activities involving technology are planned by starting with the curriculum, not the technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

13. I would agree that ongoing professional development opportunities build capacity within the staff for using technology.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

14. School leaders include the use of technology effectively as an integral part of the staff evaluation process.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

VI Access to technology and support

1) Do students have access to school email accounts? ❑Yes ❑No ❑Unsure

2) Do teachers have access to school email accounts? ❑Yes ❑No ❑Unsure

3) Do teachers have electronic access to student data? ❑Yes ❑No ❑Unsure

4) Is there support staff available to help with technology hardware and software issues?
❑Yes ❑No ❑Unsure

5) If so how many and how reached? _____

6) Is there staff available to support integration of technology with the curriculum?
❑Yes ❑No ❑Unsure

7) If so how many and how reached? _____

VI Access to technology and support, cont.
Instructions: Select the word or phrase (strongly disagree, disagree, unsure, agree, strongly agree) that you feel most fits the statement above it.

8) I have sufficient professional development and support from the school to successfully integrate technology into my instructional practices.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

9)When a computer fails and I need tech help it is usually repaired by the end of the day.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

10) Internet access and download speeds are sufficient for current instructional practices at my school.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

11) Overall I feel as though I have on-demand access to technology at my school.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

12) Overall I feel as though students have on-demand access to technology in my classroom.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

VII LIFE at ---

1) I felt prepared for integrating technology in a classroom when I first graduated from my CoE.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

2) I feel that the way that I use technology in my classroom came from what I was taught about using technology in a classroom by my college of education.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

3) I feel that the way that I use technology in my classroom came from what I already knew about using technology in a classroom before starting the LIFE program at my college of education.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

4) Now that I am in my first year of teaching I feel that I was well-prepared by my CoE for integrating technology in my classroom.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

5) I wish that in the EC-4 program I was taught something that I was not taught relating to technology in the classroom.
❑Strongly Disagree ❑Disagree ❑Unsure ❑Agree ❑Strongly Agree

6) If you answered unsure, agree or strongly agree above please explain what you feel was missing from your technology preparation:

VIII **School Demographic Data**

(these can be approximate)

1. Racial mix of your school __ White ___ Black __ Hispanic __ Asian __Other
2. Approx. percent on free/reduced lunch program _____
3. Number of computers in your classroom _____
4. Number of computer labs in your school _____

POST-SURVEY COMMUNICATION

Hi _____,

I wanted to thank you for completing the survey I sent to you and to ask you if you would consider participating in the next part of the study too.

The next part of the study would have me doing two short (about 15 minutes) phone interviews with you and in between the two phone interviews I would ask you to try to teach at least two lessons that included technology somehow and keep a journal in a private blog I have set up recording your experiences preparing for and teaching those two lessons. It would be really exciting if you could join us.

Let me know what you think and if you have any further questions about it. If you do agree I would like to set up a phone interview as soon as possible to get you started.

Thank you!
Lisa

Lisa Abate
Doctoral Candidate, Instructional Technology
Department of Curriculum and Instruction
The --------- at ----------

WEBLOG

The WebLog (or Blog) will be accessible with a password for confidentiality and privacy reasons. The research questions that I hope to be addressed by data gathered from the blog are too many for the teacher to read and respond to individually. For that reason the teacher will be prompted to write in the blog about any technology related experiences, in or out of instructional time, that they experienced over a two-week period.

Written on Blog intro page:

This is where you will write about any experiences, thoughts and reflections in regards to the lessons you will teach during the next three weeks that involve technology. The more you can explain the experience you are writing about the richer the results from the research study will be able to be.

No one will be able to access this blog other than you and me, and your name will not be on it, so feel free to express yourself without reserve.

If you experience any technical problems just write your entry in an email and send it to me and let me know about the technical problems.

Thank you for your commitment to this study!

Lisa

INTERVIEW GUIDE QUESTIONS

(their use depends heavily on the course of the interview)

1. What does technology in a classroom context mean to you?

2. Describe examples of times you have used technology in your teaching this year.

3. When designing a lesson using technology how do you link technology and the lesson?

4. Tell me in general about the technology you have available to use in your lessons.

5. Where do your ideas for using technology in your lessons come from?

6. Do you discuss your ideas for technology related lessons with any other teachers? If so what types of suggestions do they offer?

7. How much of what you use as far as technology in your classroom was influenced by your College of Education experience?

8. What type of assistance have you used in the past to help with technology related problems in the classroom?

9. When you use technology in your lessons do you feel as though there are different skills you are drawing upon as a teacher then when you are teaching in a more traditional way?

10. Do you consider your specific technology applications and/or skills to be linked to particular subject areas, or to be more general? Can you explain a bit about this?

11. How does technology fit with your teaching style?

1. Describe a lesson you have taught over these last two weeks where you used technology—if there are several to choose from then please choose the one you think was the best.
    - Why did you decide to use technology in this lesson?
    - How did the technology work with the lesson?
    - How were the goals for your students' content learning and technology learning linked?
    - Do you think that using technology in this lesson enhanced the learning effectiveness of the lesson in some way? If so in what way? How?
    - If you didn't have that technology available what do you think you might have done with the lesson?
    - In what ways did the lesson go as planned and in what ways did it not?
    - Describe any places where it was easier or harder than you expected to gain access to the needed technology for this lesson.
    - Where did you get the idea for using technology in this way?
    - Did you talk to any other teachers about it? What type of suggestions did they offer?
    - What type of preparation did you need to do to get ready for this lesson?
    - In what ways will you share your experiences with this lesson with others at the school if you do at all?

2. Can you describe a time when you were planning a lesson together with more experienced teachers and had an idea for adding in technology—how did the conversation go?

3. Perhaps your skills teaching with technology have developed over this school year. How are they now as compared to the beginning of the year? What has changed?

4. This question is to clarify something that I noticed during the first interviews… do you feel that UT taught you technology for teaching or technology alone and you had to figure out how it goes with teaching?
    - If you had to figure out how it goes with teaching…how did you do that?

5. This question perhaps should have gone at the beginning, what does it mean to "teach with technology"?

6. Finally we have a kind of role playing activity:

Imagine that you are a teacher teaching a second grade lesson on insects. I have chosen second grade because some of you in this study teach fourth, and some teach 1st and pre-

k. The next part is a lesson on the differences between butterflies and moths (size, color patterns, antennae, etc.) Think aloud as you think through preparing for this lesson.

Now you are preparing for a second grade writing lesson for later that afternoon. Think aloud as you think through preparing for this lesson.

TRANSCRIBED INTERVIEWS

First Interviews

MP Pre

LA: You know that you're being recorded so I can transcribe this?

MP: Yes.

LA: Okay. So this is your first interview, right?

MP: Yes.

LA: Okay. So what does technology in a classroom context mean to you?

MP: Technology means using all the resources available to me to best educate the students in my classroom. For example at my school we have computer labs available to us. I have a hookup from my computer in the classroom to the TV screen so I can show my students various things on the computer. And for individual students I have assistive technology for some of them to use to help them out with certain things they need help with, like electronic spell check or an electronic thesaurus or things like that.

LA: Okay. Can you describe examples of times when you've used technology in your teaching this year?

MP: Sure. There have been quite a lot actually. The computer lab we use frequently. We use it in writing to use word processors to publish the students writing. And we also used the Internet to do research for social studies topics such as biography reports on people in history and teaching kids how to use a search engine on the Internet as well as for our science fair that we're in the middle of right now. We researched our topics using encyclopedias in the library and we also use Internet search engines. We also have a science lab at my school so we've used technology in there. There's a microscope that has a camera in it that you can project what you see in the microscope onto a TV screen.

LA: Is that yours or is that from your school?

MP: That belongs to the school.

LA: Is that all of them?

MP: That's what I can think of right now.

LA: Well you might have covered a lot of it, but can you just talk in general about the technology that you have available to use in your lessons?

MP: Sure. I have access to two different computer labs in my school. We have a science lab that has a wealth of technology that I haven't even used half of probably. The microscopes, the TV cams to get up close and look at things and blow up the image on the TV screen, and in my classroom I have one computer for myself that I can let students use at my discretion, and I have a TV that allows me to hook that computer up to the TV so I can show students things on my computer using the TV screen that's in my classroom. We also have the ability to play VHS tapes and DVD movies in our classroom. Educational clips. And we

use United Streaming and Power Media Plus for Internet streaming of short video clips to help with teaching.

LA: Okay. Is that it?

MP: Yeah.

LA: That was a long list. That's good that you have so much available though.

MP: Yes.

LA: When you're in designing a lesson that uses technology, how do you link technology and the lesson? How do they fit together?

MP: Usually it seems to fit together pretty naturally to me. Are you asking how do I plan lessons to use technology?

LA: Yeah, I guess I am about planning. How in your mind the technology fits with the content?

MP: I guess it depends a lot on the content. But for a lot of it the technology seems to be pretty integrated for me at least. Maybe because I'm a younger teacher and I've been around it growing up as well. But when we're researching it seems natural for me to bring that into the computer lab to access the Internet as one aspect of our research, and when we're publishing writing, bring that to the computers. That's the way that real publishing gets done is by computers, so we do that and use different features in the word processing programs. For science I normally consult with a part time paraprofessional that sometimes works in the

science labs. So I normally just consult with her and see what's available for us to use.

LA: Well that actually leads me into the next question, which is where do your ideas for using technology in your lessons come from?

MP: A lot of them (the ideas for using technology) come from the teachers I teach with on my team that are fifth grade teachers that have been at my school for a while and kind of have these other ideas. Some of them come from me sitting at my house on my computer and just doing Internet searches to get new ideas on how to teach things. Some of them are talking to the paraprofessionals at my school that specialize. Like we have one in the science lab and one in the computer lab. So I can get ideas from them as well. And then also my school, we've had several in service days where we spoke maybe half a day at a time on learning some new technology that we can use in the classroom.

LA: So it sounds like at your school your teachers have lots of really good ideas that you can use.

MP: Yes. Yeah. Our principle is a big advocate of using technology in the classroom. So it kind of rubs off on all of us I guess.

LA: How much of what you use as far as technology in the classroom is influenced by your college of education experience at UT?

MP: Probably a great deal because I just go over the program and we use technology all the time. We had the laptops that were with us at all times, so that was an easy access to a great resource there. And a lot of lesson plans our professors would ask us to incorporate technology. So you know, when they did that, it forces us

for ways to incorporate technology that now I think has probably become pretty natural for me to just do it. I don't think about it as, oh I've got to incorporate this technology. I just find myself doing it.

LA: Which Cohort were you in?

MP: 2. -------.

LA: What type of assistance have you used in the past to help with technology related problems in the classroom?

MP: I use a lot of the same resources that I just told you I get ideas from. The other teachers, we also have at my school two teachers that are dedicated as the technology help people. And so if I'm running into a problem that I can't figure out on my own I can call the one that's designated for my grade level. And he'll usually come pretty fast to help me out or give me some tips over the phone to help me out with that. If worst comes to worst we have a technology district person that I can just email. But most problems I'm able to figure out pretty easily by myself or just by asking a teacher nearby.

LA: Is the figuring the problems out by yourself skills something that was explicitly taught to you or you just picked up with experience through experience with the computers?

MP: I think I picked that up just from having so much experience with computers and technology. Naturally I'm the kind of person when I'm using something I want to know how to use it and how to figure out if things go wrong. So I think a lot of times I just attempt these things on my own and through that I figure out things.

LA: What type of computers do you guys have? Macs or PCs?

MP: At my school?

LA: Ahem.

MP: PC.

LA: I was just thinking that you had more of a lifelong experience with PCs than Macs. And so you would have more knowledge of how to fix it.

MP: Yes.

LA: When you use technology in your lessons do you feel as though there are different skills that you've drawn upon as a teacher than when your just teaching in a more traditional way? And I don't mean skills like how to use this or that program. I mean like, you're teaching style or management of just what you're doing as teaching. Do you think those things are different when you're teaching with technology than when you're just teaching more traditionally?

MP: Well, I think at times yes, because teaching with technology is often a lot more engaging. It depends on what you're doing obviously. I would say it's definitely a different experience than when you don't use any technology whatsoever. But using different skills, I'm not sure how to answer. There's definitely different management and, you I have to teach the kids how to build that problem solving on the computer and then knowing when to stop trying to problem solve on their own and just stop touching the computer and raise their hand, things like that.

LA: Okay. Do you consider your technology skills to be linked to particular subject areas or to be more general?

MP: I'd say it's more general.

LA: So that it crosses over different subject areas?

MP: Yeah.

LA: Can you talk about an example?

MP: Of how it's general?

LA: Yeah.

MP: How I use it? Well I tend to use technology pretty evenly throughout the subject area. It's different technology for different subject areas, but you know, we use certain science technology equipment in the science lab for experiments or serving different things that we're learning about. And we'll use the Internet a whole lot in social studies, in writing, in reading as well. So we use different technologies in different subjects, but I wouldn't say I use it more in one than another.

LA: Okay. In general how does technology fit in with your general teaching style?

MP: It seems to fit pretty naturally for me. It's not something I feel like is a chore. I just use it because I think it helps me be a better teacher and makes it a little bit easier in the long run. And at times its more effective learning.

LA: Okay, great.

[End of interview]

WI Pre Interview

LA: What does technology in a classroom context mean to you? In a school context.

WI: Like for example?

LA: Think about technology in school. What does it mean to you? When somebody says to you technology in the school, how would you define that?

WI: Technology in the school, using technology for learning and to show them aspects of the content in the classroom. Helping students become more accomplished in that area because it's so important today, and it will be in the future.

LA: Okay. Can you describe examples of times you've used technology in your teaching so far this year?

WI: I've used it when I was in first grade. We talked about temperature and things like that, and the weather we'll look up online. I'll do it in front of the class, and I'll have the VGA where they can see it on the TV, and we'll look at temperature. Like the weather through the day and I use a PowerPoint presentation. One of my lessons is activating prior knowledge showing them pictures of people sleeping. I was tying that into a book about sleeping. So I did that for one of my… We have

computer programs for other centers, like math games and reading activities on the computer that they do every day in centers.

LA: Okay. When you're designing a lesson that uses technology, how do you link the technology in the content of the lesson? How do they fit together?

WI: Well like for example I use it to activate prior knowledge so we know what we're going to talk about. Or a lot of it is just, like the reading program, the math program. I use it for just kind of an extension off of the lesson.

LA: Okay.

WI: That's what we did for centers [2:53]???.

LA: Can you tell me in general about the technology that you have available at your school to use in your lessons?

WI: Okay, we have in every classroom three computers, we have a TV, and we have the [3:12]??? VGA where you can show it on TV. You can show what's going on on the computer in the TV. We have overhead projectors and we have a computer lab that the students go to every other day. First for computer course. We have a listening center in the classroom where they listen to stories. Books on tape. We have announcements every morning on a TV, kind of like going over, the principles on there every day with another teacher and they'll go over rules and regulations and announcements and they'll have slides of different classrooms doing different activities, because it shows throughout the whole school.

LA: That's nice.

WI: Yeah, every morning.

LA: Are the kids ever involved in producing that?

WI: Yes. And actually they alternate classrooms. And every week there's a certain class that gets to go up and be on the announcements where they're saying the pledge of the legion, and they say their name and what class they're in, and they lead the pledge for the whole school. And they're on the TV and they have to read it. And on the TV are the words to the pledge every single day with their picture on it.

LA: Nice. Do they get excited about it more do you think, because they're involved in it?

WI: Are they excited about it? Yes, very much. They all want to go up there. And they can't. Not everybody gets the opportunity because there are so many kids. They can get really excited about that. They also show some of their work around the school. At our school we do thinking maps. Different types of thinking maps. Like color maps, bridge maps, and thinking maps. Any classroom that has, you know, they go around, they take pictures of classroom work around the school. Especially thinking maps and sometimes artwork, and they'll show that on the announcements as well.

LA: What do your ideas for using technology in your lessons come from?

WI: A lot of it we plan all of our things, and we'll plan together everything. And we'll share videos, we'll share ideas for things you can look up online, we'll share websites. We have a specific person that comes[6:00]??? to our school that we

can call for problems and things like that. They also give us ideas. And she's on our campus. So she helps with a lot of ideas as well.

LA: Okay. Do you ever discuss your own ideas for technology lessons with the other teachers at your school?

WI: Not so much. I guess because it's my first year [laughs].

LA: Right.

WI: Yeah, we do it together. If I make my own PowerPoint, I'll share it with them or something. And I'll share what I do. I've only done that a couple of times. But I've shared it with them a couple of times, but not so much it being my first year.

LA: Right.

WI: I'm learning a lot about it myself. How to use it in the classroom and stuff.

LA: How about your college education experience? How much of what you use technology in your class is influenced by that?

WI: Well, I mainly learned how to do the PowerPoint in college. So that is really where I get my skills from that. So that's been helpful. Knowing how to do a PowerPoint, because a lot of… actually I've learned a lot of teachers there don't know how, they never really learned. And I feel like its very simple and easy to do, and I've shown a couple of teachers how to do it. So I really think it's been very beneficial. All the PowerPoint presentations we have to do in our courses. We did it with math in college, we did it with social studies, and there's just a lot of different things. I think that's been a great benefit to have.

LA: Okay. What type of assistance have you used in the past to help with technology problems you've had in the classroom?

WI: We have, like I said, a person that's assigned to our school. I'll call her. Like who do I call for problems or assistance?

LA: Yeah.

WI: Okay. She helps us. We can call her at any time. And we have a computer teacher on campus and a librarian who mainly, because they're right there. They know a lot about it. So I go to them whenever I have some kind of problem or question on how to do something.

LA: Okay. Anything else?

WI: No, that's all.

LA: When you're using technology in your lessons, do you feel as though there are different skills that you're drawing upon as a teacher than when you're just teaching in a more traditional way?

WI: And I guess I'm thinking more than just your skills of knowing how to use the technology, but different teaching methods?

LA: Right. No, I definitely feel, the kids, they really excited when it comes to anything with technology. I think they can work [9:14]??? about the lesson. I think that it's just good to show them how there's multiple ways you can use technology, good to model those skills, get them interested and excited about it. I

feel like they get more excited about the lesson and you know, teaching them how beneficial it can be. I do. I think the kids really enjoy it.

WI: Okay.

LA: They're really excited about it.

WI: Do you consider your technology specific skill to be linked to particular subject areas or particular content, or do you consider them to be more general?

LA: More general.

WI: And why do you think so?

LA: Like in which subjects do I use them?

WI: Well like let's say you mention your skills of being able to use PowerPoint. Then do you always use PowerPoint with a particular subject or is it sort of more general.

LA: No. Just in general. Because PowerPoint can be used for multiple lessons and activities. Even in math. So I don't think it seems to be linked to one subject area or activity in any way. I think you can be very creative and I can use different things for different lessons and it doesn't have to be one area of learning.

WI: Okay. And how does technology in general fit with your teaching style?

LA: We use lots of hands on activities and stuff, but I'm also very teacher directed. It's kind of good for both because it's good to start off with a lesson and good to

show them examples on the computer. But at the same time I give them lots of time to experiment. Even with the computers, use them on their own to do different lessons.

WI: Okay.

[End of recording]

SQ

What does technology in a classroom context mean to you?

It's just adding on to what the children will be working with as they get older as far as building a base, doing research projects, knowing how the computer works, kind of getting used to what will be going on later in life.

Can you describe some examples of times you have been able to use technology in your teaching this year?

Yes we go to the computer lab every Friday and we play around with different programs right now it is kind of just exploring I let them play we studied butterflies and we did kind of like an inspiration with note taking with the different stages of butterflies so we read a book about what a butterfly wing looks like under a microscope and from UT my science methods teacher actually donated to everyone in my cohort a digiscope- it was from something like the girl start program she was a part of and they were giving away digiscopes to anyone training to be a teacher in Texas and there was a book about what a butterflies wings look like under a microscope when you can see the scales so I thought that was really cool.

That's pretty much what we've been doing so far I use a digital camera to record some of what we do in class, just the fun things, but they don't really use a digital camera.

Do you then show those to them in some way?

Yes, I'll print them out and pass them around, or post them on the door just for them to look at from field trips, sometimes they do things with pattern blocks and I'll take pictures of it- they'll say hey get your camera and take a picture of this- I think it's pretty neat.

Would you consider that motivating or community building?

I think that's definitely a motivator they want to do something so I'll then take a picture and everyone can see it.

When you're designing a lesson using technology how do you link the technology and the lesson in other words how do they fit together for you?

Well like for the butterfly unit I felt like we got to do a lot of stuff because we did writing on the stages of the butterfly so that was right along with our unit and
We're going to start writing a lot more with writing workshop in January and I'm going to tie that in with kidpix on the computer and then they're going to write about the scene like the one that they created on the computer

So I try to tie a long with whatever unit we are doing
We are doing one on base ten blocks and there's a base ten blocks program on the computer so I'll probably be doing it

What kind of program is it- is it one on the Internet or one purchased for your school?

No, it's purchased, I think it's just called base ten

If you could just tell me in general about the types of technology you have available to use in your lessons

The digiscope is mine personally so we don't have those in the school

we have scanners, which I haven't figured out how to tie into first grade, digital cameras, iMovie on the computers we just have to have the technology people come pout and set it up, we have color printers that you can check out and projectors that you can check out there's only one desktop computer in the classroom and they're imacs

where do your ideas for using technology in your lessons come from?

I think through UT we learned a lot about iMovie when Mike Bell was there he gave us some lessons on how to use iMovie and we used them a lot with student teaching assignments and they assigned us lot with iMovie really in I movie when you found an aha moment with a student, so I'm pretty good with iMovie, I've been wanting to do that. Also just with checking out traditional cameras that go along with that, we didn't really use anything with scanners

But the ideas of what you'll actually do in your lessons do you feel like that is more influenced with other lessons you've seen, other teachers you work with or from UT?

Well, in science methods course with the digiscopes we did do lessons with that and we have lessons that are posted in teachnet that we can go back and look at for example the lessons we made with the digiscope.

So are you still accessing that?

Yes, actually I printed them all off from my science methods classes so I could have them all in a big binder for first grade

That was a great idea do you use that as a resource?

Yes

Any other ones you are thinking of?
Science methods was really the main one, and then the iMovie lessons

What kind of assistance have you used in the past to help with technology related problems in the classroom?

I talked to you can email the tech people and they've been on our campus 2 or 3 times a week and you can just email them if you've had a problem
If you need to use the computer lab there's also an online scheduler
They were actually I my room today because I just got a new faster computer because I'm on the school technology team and my mouse wasn't working so I knew they were in the building so I went up there and I said- My mouse isn't working- and they came right down and fixed it

That's great it was really quick

Very quick but if they're not there it would probably take 3 days for them to be able to come back and fix it

You mentioned you are the technology person for your team it's your first year teaching – right- did you ask to be on that or were you selected?

Yeah- well they asked for a volunteer (to be the technology person for my team) from each team and my team leader sent out an email and I said that I would do it because I like to stay on top of the technology so I got the job.

Do you think that that attitude towards technology is something that came from the experience at UT or was it always there?

Some of the teachers on the team are older and they're maybe a little more afraid of some of the new stuff out there like imovie and since I'm familiar with the mac I'm probably the most familiar one on the team
I think I just wanted to do it

Even though it's your first year but you know a lot about technology do you find yourself in a position of helping other teachers who have a lot more experience than you?

Yes I feel that I'm more in touch with technology then those that have more experience (teaching)

How is that?

I really think that the laptop initiative has helped me because of the macs that we have at the school I'm already familiar with it whereas if I hadn't had that laptop initiative I wouldn't know a thing about the macs going into the school

When you use technology in a lesson do you feel like there are different skills you are drawing on as a teacher than when you are teaching in a more traditional way?

Yes there's a lot more you can do on the computer or with cameras that you can't do before they had them
Is that what you mean?

Yes and even more than that

I guess I'm thinking more torwards your teaching skills like your teaching style and just what you do as a teacher

I say yes, It just makes the kids feel more in tune with their world like their world asnd so many jobs today have to do with computers and technology

I think that being on top of that is having the kids be exposed to that more definitely prepares them more for the real world than looking at books and pictures

Do you consider you specific tech skills to be linked to specific subject areas or do you think that they're more general

I use them mostly in science so far and I plan to use them in writing, math wise there are a lot of games because I found that games seem to attract my students more than anything else.

I think the computer attracts them to learning because they don't know that they are learning they think that they are playing games. I think that science has been the main thing that I think of so far

How does technology fit with your teaching style

With first grade I have kind of had a hard time because when they are on their own they are still trying to learn their first name so it is kind of frustrating having them learn how to login because it takes so long, it is kind of limited to the games in first grade.
[End of recording]

BC Pre Interview

LA: Okay. And this time I'm going to stop and check it after the first question.

BC: [Laughs]

LA: So the first one was what does technology in a classroom context mean to you?

BC: Okay. Sorry, let me get my brain here.

LA: Yes.

BC: Okay. I expect or think it's important for them to use technology in their lives so they realize the importance of it, how prevalent it is, and for them to be able to start using it to publish because that's how they will publish for the rest of their lives. And just to understand that there's different types of medias than just television.

LA: [Laughs] That would be good. Let me make sure we're recording before I move on. It seems to be. Okay. Can you describe examples of times that you've used technology in your teaching this year?

BC: We used it when we were doing survey results. They took surveys and then they used a computer to write about their surveys using different shapes with different things on the computer. And we also published their writing and used it

[1:22]???. And then they use it in pictures and various CD ROM games and different web sites learning.com and starfall.com.

LA: Okay. Did the math one, was that just using Excel?

BC: We did it in word and they just picked shapes and they put it on the Word document and then wrote twelve students had laces eight didn't. And you know, they just picked it to represent the data.

LA: Okay, cute. When you're designing a lesson using technology. How do you link technology in the lesson? How do they fit together for you?

BC: Usually I look at the lesson that I teach and I think of a way I can integrate technology in it formally through into trying to get them to be able to… Some children lean in different ways. So using that to tap in to mediate learning like more visual learner based are fascinated when the computer is on the TV, so things like that

LA: So when you're picking technology that's a good fit for your content, you're thinking of how to expand the content to each more diverse learning styles?

BC: Yeah, sometimes.

LA: Okay. Are there other things we can do?

BC: Um…

LA: Just because you said sometimes.

BC: I don't know. Right. Yeah, that's what I'm doing in just wanting to expose the kids to technology as much as possible.

LA: Okay. Can you talk in general about the technology you have available in your school to use in your lessons?

BC: We have computers in our room and we have TVs and VCRs. And we just now bought scanners and digital cameras that we use as well.

LA: Cool. Nice. Did they train you on those?

BC: No. And I already have a digital camera, so I will probably use my personal one because I already know how to use it.

LA: So they're through the whole school?

BC: Yeah. Each team got one, so first grade has a digital camera and a scanner to use.

LA: Did it come along with any ideas of how to use it, or did they just deliver it and.

BC: I haven't seen it yet because the team leader gets it, so I haven't actually even seen it yet, but I was told that we got it.

LA: How long have they been there?

BC: About a week or two.

LA: Oh, that's not long.

BC: Yeah.

LA: Where do your ideas for using technology in your lessons come from?

BC: Mostly from what I learned in school from UT. I, you know, for publishing obviously, that's just an obvious thing they give. And then the web sites came from the team members that I work with, and then like PowerPoint and things like that I learned at UT. And then United Streaming I used during student teaching, so I just continue to use that as well.

LA: Okay. Do you discuss your ideas for technology related lessons with any of the other teachers?

BC: Sometimes we discuss as a team different ways to use technology. So if I found a way that, you know, I thought worked in the room, I'll share that with my teammates.

LA: Do they ever offer suggestions? Is it a discussion?

BC: They'll offer suggestions, normally about web sites or United Streaming if they found something appropriate on United Streaming for us to watch. But mostly not.

LA: This isn't a question that I had originally written down, but it's something that's come up a little bit, so I've been asking it anyway. Do you find yourself, even though you're a first-year teacher, in more of a leading role when it comes to technology because of your background?

BC: Yes. Yes. Most definitely.

LA: Can you give some examples of that?

BC: I just think I'm more knowledgeable than the two ladies that I work with, with Macs in general. And that's what we're working with. And the programs, I've had to show them how to work with some of them and they come to me with questions on how things work or how to do things with the computer. So I think I just had more exposure and experience with these kinds of software.

LA: And are those how to do things with a particular… like with programs or with fixing it? Is it more technical?

BC: Both. Like how do you, you know, fixing it they sometimes ask and sometimes I can't fix things. I had fixed a couple of things that I knew how to do. But especially with programs, like how do you do this in Word, or how would you do this in PowerPoint. You know, how does this work in PowerPoint, I've never used it, you know.

LA: Okay, yeah. What type of a system have you used in the past to help with your technology problems in the classroom?

BC: I've called the helpline. The AISD help line, and we have a computer contact person on campus. He's a second grade teacher, so he's helped. He can actually access… he can get on my computer from his room on his computer and fix little glitches like that.

LA: Cool. That's so cool isn't it? When you watch people do that.

BC: Yeah [laughs]. He's like, it's fixed. I'm like, oh. Great. Thanks!

LA: Let me check this one more time. I think it's still setting well. Good. I don't know what happened last time. When you use technology in your lessons, do you feel as though there are different skills that you're drawing upon as a teacher than when you're teaching in a more traditional way?

BC: Yeah, definitely. I think I'm pulling more from the skills that I learned at UT is a lot of what actually helps me in teaching. Most of what I've learned at UT was technology based. I learned a whole lot about how to do this job other than that at UT is teaching… or taught me how to teach. But the technology aspect I'm definitely pulling skills that I learned there and just basically the skills that I work about how to use a computer in different ways to utilize it in the classroom and you know, in math especially we use technology a lot and I really gained some different kinds of skills. Like in PowerPoint and just representing math problems that seem to engage the children in the classroom.

LA: What about the how to teach part? How does technology fit with that view? With your own teaching style and what you do with the classroom?

BC: Depending on the lesson, I like to use it because… It fits for me because I use the technology so much, and I use it for pretty much everything. Publishing and everything. Anything I do I type it, I don't write anything by hand hardly at all. It fits for me to do that and the response that I've seen it gives… it makes me realize that it does work, and they enjoy it, and they're getting those basic skills starting to learn ways to navigate the computer.

LA: Okay. Do you consider your specific technology skills to be linked to particular subject areas? Or do you see them more general?

BC: I see them more general. And I normally think about what I'm doing before, you know, what do I need to teach or what concept do I need to get across before I think about technology. I mean it wasn't so massive a great… I mean writing obviously is the top one to use it for… for publishing, which is basic publishing. But for math, it works well for PowerPoint and representing survey results, it's a really great one.

LA: That sounds like an interesting on that survey results one.

BC: Ahem.

LA: Well that's all these questions.

[End of recording]

UL Pre

LA: What does technology in a classroom context mean to you?

UL: Anything thing I can do as far as computers and different things I use for displays. Like some of the things I use as far as like digital projectors for my laptop.

Showing them slide shows are an easy way to talk about your steps. Stuff like that. They help them normally see.

LA: Can you describe examples of different times that you've used technology in your teaching this year?

UL: I've done a few slideshows from my laptop. With a digital projector I tried a microscope I used a couple of times. There's certain things we're doing in the lab just to get a closer look. We use computers for projects and stuff like that.

LA: Okay. Who's your… which cohort were you in at UT?

UL: Cohort 3.

LA: When you're designing a lesson using technology, how do you link the technology and the lesson? How do they fit together for you when you're planning it?

UL: I just figure out a place where I can put it. I do my regular lesson, but I find a way to fit in, like UnitedStreaming.Com, I plug that in just to reiterate what I'm teaching them.

LA: Can you talk to me about the technology you have available at your school to use in your lessons?

UL: I've got six Dell computers in the classroom, a digital projector, they have some iBooks there but they're not very good. They die really quickly. [2:31]???. The microscope thing is mine. I bring that one myself.

LA: Is that it?

UL: Yes.

LA: Where do your ideas for using technology come from?

UL: I lot of it (my ideas for using technology) came from college. I learned a lot of stuff from there. And then the principle or a technology person trades ideas with us. And so we keep doing that.

LA: So when you talk about the principle and the technology person, what about other teachers at your school?

UL: Honestly a lot of other teachers at the school so far are not technologically literate. They don't know much about it. So basically they come to me or the other teachers coming in that know more about technology.

LA: Do you find yourself having to do a lot of assistance even though you're a first-year teacher with more experienced teachers?

UL: No, not really. Our school is a very low-income school so we don't have as much as other schools do as far as technology goes. They ask me questions about technology stuff. But basically they don't come to me about it very much.

LA: What type of assistance have you used in the past to help with your technology related problems?

T: What kind of assistance do you mean?

LA: Like the helpline or anything like that.

T: Well so far nothing because I haven't had a need to do it. The only person I really go to at the school is our technology person if I need help with anything.

LA: Is it one person for your whole school or are they shared with other schools?

T: No, she's a second grade teacher at our school. She knows a lot more about technology than I do. So she had to take care of all problems like software or hardware, anything like that. So I just go to her if I have any questions.

LA: When you use technology in your lessons do you feel as though there are different skills that you're drawing upon as a teacher than when you're teaching in a more traditional way? And I mean your teaching style in way of designing a lesson. Is it different when you're incorporating technology than when you're teaching more traditionally?

UL: I use technology really to switch things up. I use it in a traditional way most of the time. But I feel like the technology can really buffer that when I'm trying to teach them. So when I throw that in there I kind of approach them differently. If I do that's really going to drive this message home.

LA: You mentioned that the principle is one of the people at your school that has technology ideas. Is your school trying to support a lot of technologies?

UL: They are now. They're trying to get involved in technologies as much as we can. But it doesn't really show up a lot. Like there's not a lot of opportunities to use it unless I come up with my own.

LA: Okay. I was just thinking that you were mentioning there's the after school tutoring going on, you're spending a lot of time doing taks preparation. And I was thinking that probably doesn't lend itself well to a lot of technologies.

UL: No, not really. But they actually have primetime on Tuesdays, which is after school enrichment day. And I know a lot of grammar[6:10]???, and I was teaching PowerPoint and stuff like that for the older kids. The class in the library has eight computers. She knows the basics of PowerPoint computer stuff.

LA: Okay. So yeah, so it sounds like your school is trying to embrace that more. Do you consider your specific technology skills to be linked to particular subject areas or to be more general?

UL: It's more general.

LA: And can you explain that?

UL: I don't really use the Internet much for math, I can say that much. But I use a lot of Learning.Com for the kids. [6:50]??? language arts and United Streaming for social studies and science. I actually [6:54]??? so I can use for every other subject. But as far as math goes I don't have much.

LA: And so that's what you use the Internet for?

UL: Yeah.

LA: For what? For games or…

UL: The Internet they use is basically for researching projects. They're supposed to use NetTrigger, not Google. And that triggers the Austin ISD family one?. That depends on the other sites on Google you can find. So they use that for science projects, for like adaptations of animals, and they look that up on NetTrigger. A lot of these kids don't have any computer backgrounds. So it's kind of like, on the computer they don't know what to do. So I have to show them.

LA: You teach fifth grade, right?

UL: Yes.

LA: And how does technology fit with your teaching style?

UL: It fits in where I can get to it basically. I don't get a chance to use it as much as I'd like. I like to do a lot of projector stuff with the projector. The problem is they only have one at the school. So the other teachers want to use it. So I don't get to use technology as much as I would like. But I try to use it as much as I can so they can be experienced with it and see it.

LA: Do you feel comfortable with it? Does it fit well with how you like to run your classroom?

UL: It fits well enough. If I can get it to fit in, yeah it will fit. For this time of year, not really because of taks.

LA: Right. But then you're going to have that from now until April, right?

UL: April, yeah. That puts a damper on things.

LA: Yeah. Okay. That is it for the questions I had.

[End of interview]

KQ Pre

LA: You do understand I'm just recording you so I can transcribe it and look at it.

KQ: Okay. That's fine.

LA: What does technology in a classroom context mean to you?

KQ: I think it means several things. Definitely computer use, not just for teacher. I also have different activities where kids can go to the computer and do different activities. Like a CD that's computer based. Like literacy through the computer kind of thing. I've also done on my main computer it's hooked up to our TV in our classroom. Though I guess its streaming maybe? I'm not sure that's the proper term for it. Where different things online that they can see. Or there's a mini lesson by reinforcing a concept or at the same time a basic introduction to maybe a topic that we're coming just a week. Maybe showing it. That's something online.

LA: Can you describe examples of times you've used technology this year?

KQ: Yeah, several times. Definitely something that I use fairly often, maybe two or three times a week is, like I do a lot of the videos like computer streaming.

LA: Like United Streaming?

KQ: I'm not sure. Or things on the Internet that I put through my TV and then the children watch it off the big TV in our classroom. That might be it, I don't know if that's what it's called.

LA: I would just say that your using the TV as a way to show it to them instead of a computer screen.

KQ: It might be called streaming. I've heard people refer to it as that. But I use a lot of literacy. Like different stories that authors have read. Like it's a good way to do an author study. And then at the end they have it online where the author actually reads the book that we've already gone over to them. And that's really exciting to them because they actually see the person who wrote it and they can get a little into their personality. A couple of times there's been iMovies where they've kind of helped me create it. We were setting shapes. And we did a shape walk throughout our entire school, and just looking at the different shapes that we observed. Things in our hallway. We took pictures of it and they told you what it was, and then we created all those pictures into an iMovie talking about, here's all these circles we saw in our school. Here's all the triangles we observed in our school kind of thing. Those are a few things we do. We definitely do a video that's always, like that's VCR, TV and video to reinforce concepts at the end of the week kind of thing.

LA: When you're deciding a lesson that uses technology, how do you link technology and the lesson? How do they fit together?

KQ: I'm not sure if I understood your question.

LA: Where do they fit together maybe is a better word. So you're designing a lesson, you're going to put technology into it. How does that fit go?

KQ: I think for me, I've used it several times as an introduction to a lesson. I was teaching clocks one time. And something I found online, it was just introducing. There was a cartoon character talking about how he didn't want to be late, so he needed to figure out the time. So an introduction that way, but at the same time it was a lot of reinforcing had been done with it. Like the importance of it, there were like connections kind of thing. So sometimes introduction, sometimes reinforcement of things that they've learned, and it's reinforced a different way.

LA: Can you talk in general about the different technology you have available at your school that you can use?

KQ: Okay. I think I'm very blessed at the campus I'm at. I don't think I've ever not had what I've needed. Digital cameras are available for us whenever. We all have computers in our classroom with the Internet. We also have other computers. They're not hooked up to the Internet, but they're there to use a CD ROM for our kids if we need it. We have a computer lab with about 30+ computers. Our whole class goes there once a week and we have different things we learn about the computer. Scanners that are used. We can check out laptops, projectors, that sort of thing.

LA: Wow, quite a bit.

KQ: Yeah.

LA: Is it something that's easy to get access to or are there a lot of teachers trying to get to it?

KQ: Not really. I haven't had a problem. And usually I ask a couple of days before and they're like, okay, it's available, just come get it. So it's not like I've had to do that.

LA: Where do your ideas for using technology in your lessons in technology come from?

KQ: I've done a lot of things other teachers have done first that have worked well. I've also gotten a lot of ideas from the Internet. Like other lessons that people have done for the Internet that I've heard. That's where I'm concerned more. Just remembering stuff that we had to do when we were in our classes.

LA: What type of other suggestions did teachers offer?

KQ: I think they (other teachers) just tend to offer how we can take the lesson and use it on the computer. If it's like a basic graphic organizer. Well you know there's a program called inspiration I think is what it's called. And I had turned to that. Like Kidspiration. Things like that where you can know there's this program you can use like that. And different programs that are in the labs.

LA: How much of what you use in your classroom with technology was influenced by UT with your college experience in teacher education.

KQ: A good portion I'd say. I have honestly never had any interaction with a Mac before. And then everything in our schools are completely Mac as well. They're all Apples. And so I think I have an advantage amongst my team members because they only use PCs. So just using the computer to take attendance or basic things on a computer. I don't think I would have known it unless I had had a laptop during college. I mean there're several things. Like I would have never

learned iMovie, and I think that's the kids get really excited when they know that we've created a movie on our own, just like the real people do. That kind of thing. Creating it. Oh, and at the end of the year we created a DVD of the whole year, and they get to take it home with them. Those are all things, like I never knew how to burn things from my computer. Things that I've learned.

LA: Were you teaching last year here at all?

KQ: No, this was my first year.

LA: Was this an idea you came up with at the beginning of this year to do at the end, like burning a DVD at the end of the year?

KQ: It wasn't mine, but other people had wanted to it but they never knew how. So now I knew how to do it.

LA: That's great.

KQ: Yeah. Because before people made scrapbooks of it. Kept all their pictures and each kid would get like a little mini scrapbook. But instead I put all those pictures on an iMovie and created it into a nice DVD and then give them that. Parents were very supportive and PTA was really supportive of providing DVDs for us to burn.

LA: Yeah, that can get expensive.

KQ: Yeah.

LA: What type of assistance have you used in the past with any technology related problems that you've had in your classroom?

KQ: Really only a couple of people are computer gurus in our school. And so we would ask these people questions. If they can't answer it, then we have a helpdesk number that we can call.

LA: Are the computer gurus, are the other teachers or are the volunteers or parents?

KQ: Yeah, they're teachers. Yeah.

LA: Okay. When you use technology in your lessons, do you feel as though there are different skills that you're drawing upon as a teacher? And I don't mean just like your knowledge of the technology programs, but different teaching skills, teaching styles, teaching toolkit type of things that you're drawing upon as you're teaching those lessons as opposed to when you're teaching in a more traditional way? Do you think you're drawing upon different styles with the different types of lessons that you're teaching? So if you're teaching a lesson that's very traditional book based versus if you're teaching a more computer centered, more technology centered lesson, do you feel as though there's anything different in your teaching?

KQ: I have to do it differently.

LA: When you say you have to do it differently, what do you mean?

KQ: I think differently (when I teach with technology than more traditionally). Not in a basic, okay, this is the one way to get the answer, but showing that there's different ways to learn about a topic or to only see certain books. There's other

ways you can research things other than reading books or going to the library to just get encyclopedias. Showing them computer based things as well.

LA: Do you consider your specific technology skills now to be linked to particular subject areas or it to be more general?

KQ: I think more general because I may be leaning a little bit towards reading or like literacy. Because a lot of things that I've done is storybooks online or them watching a story read to you with the book pages being seen on the screen, or hearing it off, they'll read it, or just audio on Internet streaming. But I've used it with other subjects as well.

LA: How does technology feel with your personal teaching style? Is it a good fit with it? Does it work for your class?

KQ: I would say yes. Lots of my children have computers and so when they see it in school they get very excited and are like, yeah, I know how to do that, kind of thing. I feel really comfortable with it because I had to do certain things in the UT program. So like I feel more comfortable using it while I'm teaching, than me having to learn it all first, then try to teach it. I like to feel prepared when I go into teaching. And if I didn't know my computer, whatever I was doing with technology that I feel confident about I doubt I would. So I feel like with so much practice we had to make iMovies, or PowerPoints or whatnot. I probably would not be using it.

LA: Okay. Which cohort were you in?

KQ: B.

LA: Who is the teacher for that?

KQ: The coordinator kind of split in the end of the last of it because she had some health issues, or her family did. The first one was Gill Allen. The second one I think was Francis? Monteverdi was their last name.

LA: That is it for the first interview questions.

[End of interview]

LH Pre Interview

LA: Okay. So if you could start with just telling me what does technology in the classroom context mean to you.

LH: Well it's anything that's really isn't paper that students use to learn. Like it's not workbooks, books. Anything that's electronic that students use to learn.

LA: Okay. Okay good. If you could describe examples of times that you've used technology in your teaching during this year.

LH: Well we have morning announcements every day on TV. And my kids get to be a part of that and go help run the cameras and run the sound equipment and at once… we're going to turn every single time[1:44]??? right before Christmas. And we got three of the announcers and we helped the little kids who come in and help say the pledge and stuff. That's pretty cool, they like that a lot. We have… I call it computer learning centers where we… we have centers in their classroom that's independent work whenever they… they get to do whenever they have finished all their other work. And usually I can find something that goes with

what I'm doing just by, like, an Internet search. They have some sort of computer game that… like learning and reading, whatever we're doing in the classroom. Subject, [2:24]???, spelling or whatever that they get to do it. I don't like to call it computer games though, because I think they're learning centers. If we call it games they focus so much more on finding the treasure than solving the question to find the treasure, you know?

LA: Right. So, but just by changing what it's called they focus on it differently you found?

LH: Oh yeah, definitely.

LA: Wow.

LH: Definitely. They do PowerPoint presentations and they type up all their stories on… well not all of them. Usually probably every other story we do, they type up in Word and we'll go into the computer lab and they get to work on… It's not SRA, it's CCC, and I don't know what it stands for. It's like computer, classroom computer curriculum or something like that where they actually learn how to do word documents and how to navigate the computer and how to do this and how to do that. What else do we do? Oh, they have… we don't have a set of dictionaries. Well we have a little set of dictionaries. We don't have a classroom set of dictionaries. We have, like, half the class set of dictionaries. So usually most of them will go straight to the Internet. We have Dictionary.com or whatever on our desktop and they use that thesaurus and that dictionary. That for their research material. What else do they… Oh, we have accelerated reader. That program where you read books and get points.

LA: Right.

LH: Take tests. What else do we do? We have a classroom… a [3:58]??? that these little computers that kind of… they're kind of like, half typewriter, half computer. They're not like a full out laptop.

LA: They're like tablets. That's what they're called.

LH: Yeah. And they use those every so often and we program text questions into them and they can go in and answer text questions that way. My mom's a big technology person at the school. She's not the one in charge of computers and stuff, but she's the one that knows all the technology things[4:29]???. And she is working on getting a really cool system put in the classroom for forth grade and fifth grade where they… we don't have it yet, but we should have it next year, and I'm really excited. It's like, they have remote controls, and we can program in questions and stuff and they can all button in and it's just…

LA: Oh, I've seen this. Yeah.

LH: They're so cool. I just went to a student service on it. Oh, I was really excited.

LA: Are you going to have those set for all the classes or one class set that runs around?

LH: We'll probably have one for each pair. I pair with another teacher and then we have another set of paired for fourth grade. So we'll probably have one for… we'll probably have four sets. Two for each grade level.

LA: Oh, okay. And then you would be able to have it like a every other day sort of thing sort of thing, because…

LH: Well whenever we really needed it.

LA: But it would be enough that you and another teacher would share?

LH: Oh yeah. Definitely.

LA: That's great.

LH: I mean it'd probably stay with the language arts side. And then when the math teacher needed it or wanted to do something that required it, we'd just take it over there.

LA: I've seen that used in a college astronomy class [laughs].

LH: Amazing.

LA: Where…

LH: [5:52]???.

LA: And then the teacher can push a button and the… the distribution of the responses is graft on it.

LH: Yeah.

LA: Yeah?

LH: Yeah. You can see… you don't see who missed what. But you see, like, how many people chose A, how many people chose B, you know.

LA: Yeah. And they can all see that and you can have a class discussion about why is it you think that this one was the second most picked. And it's just great I think.

LH: Yeah, it's great. And the kids are… it's not just paper. Everybody look at your paper. What did you get for number two, you know.

LA: Ahem.

LH: And we can address problems right at that moment.

LA: Right.

LH: Not, okay, everybody turn them in, I'm going to grade them tonight, we're going to talk about them tomorrow, you know.

LA: So that would lead me to wondering, what do you think is the… I'm not even sure if I have this as a later question. But what do you consider to be the benefit of technology in a classroom?

LH: The immediate feedback. Almost everything we do that is technology oriented, you can… you can grade right then. You know what you missed right then. It's not… I get so tired of doing papers and grading papers. And I know my kids do too. You get so buried in papers. But with electronic it's so much more manageable. Like no matter how many things you do, it's still just one computer. It's not like a big old pile. The kids enjoy it more. It doesn't seem so much like schoolwork as a privilege to get to… I get to use this computer. And to use this

computer I'm going to do it this way. I'm not just writing a story, I'm typing a story.

LA: Right.

LH: Usually they have… usually, not always. Sometimes I really do want just a story, or I do want, like, poster board. Usually they have an option of, they can write a report, do a PowerPoint presentation or make some sort of visual presentation for any big project that we do.

LA: So how do… Go ahead. Sorry.

LH: Well they can… they get the choice.

LA: So how do you as a teacher decide the ones where you really do want them to make it out in paper only or were you going to give them that choice?

LH: Well they usually get a grade. It's more focusing on… if we're focusing on visual presentations, I'll want a visual presentation. If I'm just grading content, they get a choice. But if we're working on a specific skill that goes along with one of the mediums of explanation. If we're focusing on learning PowerPoint, then I want a PowerPoint presentation.

LA: Okay. So is it tied at all to the content, what you might want a presentation to be?

LH: Well sometimes. Like if we're doing something that I kind of want them to, like tell me a story, I want more of a story. But if I want them to recount favorite parts or if I have like a category of things that I'm addressing. Like if you're

addressing studying characters and this, and this, and this. I don't really care how you tell me. It's just more of like a flowing something. I'd rather… paper.

LA: Okay. When you are designing a lesson using technology. How do you link the technology in the lesson? How do they fit together?

LH: Well I just… I usually think about what… this is probably not what you're looking for, but I usually think about, which way is it going to be easier to teach this.

LA: Okay.

LH: Which way are the kids going to enjoy it more and I'm not going to be having to ask them questions rather than them come up with answers.

LA: Okay.

LH: And I am very technology savy. Like I guess because my generation grew up with that. But it's easier for me to type up a PowerPoint presentation than to write out a lesson plan type of handout and look through all this… I have a couple of [9:42]??? teachers. And [9:44]??? my mom's school. Like the school that my mom's been teaching at forever. And I went to, like a thousand years ago, I knew a lot of people. And because I decided to go into teaching, my mom has been helping me collect resources from teachers who are retiring and stuff. So I have books upon books upon books upon books of activities. Oh, puppy. I have my puppy. I'm just putting him outside. Books upon books of things of resources to look through. But it's usually easier for me to browse the Internet for lesson ideas that already have technology in them, or… or books for like information, a type of a PowerPoint, or…

LA: So it sounds like managing the content of the lesson.

LH: Yeah.

LA: Okay [laughs]. Not to put words in your mouth, but trying to summarize that into like a category as compared to maybe managing the classroom.

LH: Yeah.

LA: Okay [laughs]. Can you tell me in general about the technology that you have available at your school that you can use in your lessons?

LH: Well pretty much I told you. What we have [laughs]…

LA: So you have computers in your classroom?

LH: Yeah, we have three computers in our classroom. And we have like leap pads. Those little leap pad laptop-like things for my little readers. Most of my readers don't use that. Most of us are not in forth-grade level, yay. But I still have a few that use that option if they want to. And then we have the notepad card.

LA: Right.

LH: That they can use when they want to. We obviously use the Internet classroom and overhead, I don't know.

LA: [Laughs]

LH: We have a really really really nice computer lab. Actually we just got it. That we go to once a week. And then is opened pretty much any time I need it. I mean those teachers go pretty much… I can find the time to work it into my lesson if we go there.

LA: Okay. Good. And what kind of computers do you all have there?

LH: Um… we have [laughs].

LA: I mean, like PC or like, you know, like PC or Mac.

LH: They're PCs. And they're mostly newer. We still have some that are kind of [12:22]???. But they work.

LA: Do you have projectors so they can see what you're doing?

LH: It links into the TV.

LA: Okay, good. That's nice. I like that [laughs]. Personally as a teacher I like that.

LH: Yeah. And they can see whatever…

LA: So where do your ideas for using technology in your lessons come from? You mentioned surfing the Internet.

LH: Well, I mean we have… I'm working with a lot of really seasoned teachers that are really great, have a lot of really great ideas. And they'll say something like, LH we want to teach this and we have this. Activity to go along with something, because doesn't[13:05]??? have any ideas. And I'll get on the Internet and in two

seconds have like a thousand activities, or information to put into a PowerPoint, or whatever. Mostly it's the Internet. Mostly it's just sort of knowing what we teach and use anything.

LA: That's great. How much do you use as far as technology in your classroom is influenced by your college and education experience?

LH: You want like a percentage or like a…

LA: You can just describe a little bit.

LH: I use inspirations. That's pretty much all that we used in the college of education that I… My college of education classes weren't really technology based. We had lots to take notes on and talk on the Internet on. But we didn't… I don't really feel like we had that much technology in our classes.

LA: Okay. What do you think… hold on, I have to switch my hands here [laughs]. Okay. My old tech solution to having a telephone recording means I'm unfolding two things at once here.

LH: [Laughs]

LA: My arms are getting tired [laughs]. So this stuff that they taught you didn't feel like it was really applicable to your classroom?

LH: Well I… and this is going to sound awful, but I don't really feel like we used technology. I don't feel like they taught us much about technology. [Puppy whines] Will you cut it out! Sorry.

LA: Is that your puppy?

LH: Sorry. He's a big baby. We just got him when he was four weeks old.

LA: Aww.

LH: And he's just a huge crybaby.

LA: [Laughs]

LH: I know we used PowerPoint and I know we use Excel and Internet searches and Word. But I don't really… we didn't branch out very much.

LA: Okay.

LH: Like I would have liked to learn to use GradeKeeper and Adam, or information processing activities. In reading difficulties we did do a lot of how to find and keyword searches and stuff that's been really helpful. I mean she taught us how to find information, which is sort of specialized.

LA: Okay. Okay, so let's go back to your classroom then. What type of assistance have you used to help you with technology related problems that you've had? Probably your mom.

LH: Yeah. Well I mean, I probably know the second most about technology at my school honestly. My mom is the kind of… she's not like the computer person, but she's helping everybody move into this century. And she has been a source of a lot of ideas and a lot of help. I'm teaching it a couple of times and asked my cohort if they had any idea how to do something or if they had any ideas on some

things, which has been helpful. But really it's to like, going to… Like we just had to do this star chart evaluation for our school district. I think that's a Texas thing now.

LA: Yeah, I think I know the star chart.

LH: But my assistant principle is supposed to help all the new teachers get logged on and do this and do that. And it was tending to be a bigger deal because he was helping them.

LA: [Laughs]

LH: And he was just, like trying to figure it out. It was awful.

LA: [Laughs] So do you find other teachers turning to you for help?

LH: Oh god. Yes. There's someone in my classroom probably three or four times a week saying something like, well I know how to use PowerPoint, but how do I make it do this. Or like, can you help me get logged onto this. I'm like, GreatKeeper is doing this. How do I fix it or something. I mean it's fun.

LA: Yeah.

LH: It's kind of neat because there's teachers that were my teachers.

LA: [Laughs]

LH: A lot of them.

LA: Well how is that as a first year teacher and now you're in this position to help the ones with experience.

LH: Well he was helping them with technology, which I feel very confident with. [17:29]??? whenever I need help with eating[17:32]??? ideas and stuff. Like I've had some teachers come and say things… like I have like one teacher who knew what a zip drive was. And I had typed up all of my report card information with the name and the school and all that stuff you have to write on the report cards, so that I could just feed it though my printer and change the name of each kid every single time. And I asked her if she wanted that on her computer. She said, you can do that? I said, yeah. And so I went to her computer and there's those black eMachines or whatever that have that flap in the front covering up the USB port. And I flipped it open and she screamed bloody murder, like I took the front of her computer off.

LA: [Laughs]

LH: She's like, you can open that!

LA: [Laughs]

LH: They're from the dark ages.

LA: Oh that's funny.

LH: She's been teaching there for ten years. She probably hasn't had the computer ten years, but she's had the computer for a while. Had no idea that you could open up that little front panel.

LA: Oh my gosh.

LH: Oh, you are insane. My dog.

LA: That's funny.

LH: He was putting his whole face in the water and he's got water in his nose.

LA: Oh [laughs]. Poor thing.

LH: Baby. Okay.

LA: When you use technology in your lessons, do you feel as though there are different skills that you're drawing upon as a teacher when you're teaching in a more traditional way?

LH: I don't really know how to answer that because I haven't… I mean this was always the way I was taught. I don't know if… I don't know indifference.

LA: Well do you know if you teach lessons where you're not using technology. Where you're just giving it from the books, paper, pencil sort of thing.

LH: Oh yeah. Yeah, it's different. I mean it has a whole different feel to it. I mean I feel like we're going slower and… more boring. It's hard for me to do.

LA: It's not as much fun.

LH: No. It's not as much fun to teach, and it's not as much fun to do.

LA: Okay.

LH: Like for the kids I'm sure.

LA: Is there a different way that you approach the content? Is there a different way you approach classroom management.

LH: There's less classroom management …I feel like it's like more boring to me, so the kids kind of pick up on that. And they try to get a little chatty or a little, like, hey look, it's the ceiling, you know.

LA: [Laughs]

LH: I don't know if they got that from me or there genuinely feel also that the class is moving a little bit slower when, well it's like, okay, everybody take out your book and turn to page seventy-two, you know.

LA: Okay. What about…

LH: I think that's probably more exciting.

LA: What about how you approach the content itself. Do you feel like you…

LH: I don't think it's that different. Because you kind of start off with an idea. I want to teach the group agreement, how am I going to do it? I can either open up a book and read out of the book, or I can take out a PowerPoint slide, or I can find a computer activity. You know, several times we touched computer groups and we'll just put… like we'll talk about the rules in front of the class, and then we'll go to our computers and practice. I think that's a lot more fun.

LA: Okay.

LH: And then I just go to different groups and ask some questions to review the rules. Well that can't happen. Why can't that happen? Yeah, that's right. There's an [20:54]???.

LA: Do you think that your specific technology skills seem to be linked to particular subject areas or to be more general?

LH: Well I mainly, because I just teach language arts I mainly just use them in language arts. I feel more comfortable in language arts. I would have a harder time teaching math and, well probably not science. But I've had a hard time teaching those other subjects. So I probably wouldn't feel as comfortable binding technology to those others.

LA: So you teach language arts. You also teach social studies or just language arts?

LH: Sometimes I teach social studies. Social studies is kind of, it's like… it's awful and I hate it, because social studies is one of my favorite subjects. But it's whoever can fit into the subject that they're teaching you.

LA: Oh, okay.

LH: Teaching social studies.

LA: Well I mean you can probably fill in a lot with stories.

LH: Yeah. And we do a lot of practice with the stories and the research that we do is usually on social studies.

LA: Okay.

LH: But nobody really teaches social studies, which just [22:04]???.

LA: Because there's no test on it.

LH: Well yeah. And that's… I mean that's the whole point.

LA: Right. How can technology fit with your teaching style?

LH: I don't know. I mean it makes you get up more. You're not just sitting with paper in front of you.

LA: Do you think it's… it sounds like it is, but would you say it's a good fit for your personal teaching style?

LH: Yeah, definitely.

LA: What part of it do you think it is?

LH: What part of technology or what part of my teaching?

LA: Both. What about them and how they work well together works?

LH: Well I feel like technology is more interactive.

LA: Okay.

LH: And more energetic. Because you… I mean it's more stimulating because it's not the same thing that you've always done.

LA: Okay. That is it for my set of questions. Do you have any questions that you feel like I should have asked that you want to say something on? I always want to give people the chance. You don't have to.

LH: I don't think so.

LA: Okay. So have you had a chance to look at the link I sent for the blogs?

LH: No I haven't looked at it yet.

LA: Do you want me to read it?

LH: Well I saved it.

LA: Oh, okay.

LH: The password is…

LA: Password.

LH: Password. And the blog is my name?

LA: Your initials.

LH: My initials. Okay.

LA: So my idea here is that in the course of the next several weeks the next time you are teaching a lesson involved in technology, which it sounds like it happens a lot for you [laughs].

LH: Do you mean like any technology or technology specific?

LA: No it doesn't have to be that the topic is technology, but just that there's technology involved I the lesson somehow. So the topic could be plot. But if there's technology in there. Does that make sense?

LH: So do you want every single time I do that?

LA: I don't want it to become burdensome for you. But the more accurate it is to what's actually going on in your life the better it is.

LH: Okay.

LA: But if it's getting burdensome, that's not good either. So the option could be that you just maybe go back, and it sounds like you do it a lot. A love of technology. So you could go back and do it, maybe keeping like a word document open somewhere and jotting it here and there and here and there and pasting that into the blog so you don't have to go into it all the time.

LH: Do you want formal lesson plans?

LA: No, no, no. Just your reflections. I want to be able to find the barriers that you face to making a lesson they way you want it to be. The things that make it easier

for you. I'll probably be looking for ways that you make a marriage between technology and the content itself like you're teaching solid[25:02]??? technology. So things that I would expect to see, like I really would love to do this lesson this way, but we don't have these remote control things yet, so I'll just have to do this instead. And then, oh I want to do this on this day, but the lab was all booked up, so I'll have to do it this day. And oh, this worked out perfect and it was great because the kids got to see this and it was a total surprise and thank goodness we have the Internet because they would email. You know what I'm saying?

LH: Oh, did I tell you [25:30]??? used that a whole lot.

LA: Oh, good [laughs].

LH: Did I say that.

LA: No [laughs]. Does that make sense?

LH: Yeah.

LA: Okay.

LH: Definitely.

LA: Okay. And then near the end of maybe a two or three week period depending on how proficient people are putting in their blogs, we'll set up another phone interview just to sort of debrief on the experience.

LH: Okay. And you want me to kind of remember and go back and do last week? Am I behind? Or at least…

LA: No, let's just go from this week on.

LH: Okay.

LA: Unless you feel like there was something really great last week that you want to include and then yeah, go for it [laughs].

LH: So last week was a total mess.

LA: Okay.

LH: We had so much crap. We have a lot of… because I'm the new person and I'm very technology oriented. I have to do a thousand in-services online.

LA: Oh.

LH: Like she keeps giving me these, like, writing academy online. Which is a twelve-hour course, "that you can take whenever you want".

LA: Yeah. Like you have twelve-hours.

LH: [26:34]???. And like the writing grader for the ESL student online. So I have like these crazy online deadlines to meet on top of everything. Yes. [26:47]???. So it will be better this week on?

LA: Yes.

LH: Okay, great.

LA: It will be much better, because I had two different conferences. And I had some grades due. And I had lessons plans do. And last week I had two of those Internet in-services due.

LH: Oh my gosh, you really have been going around crazy.

LA: So that's why today I'm going shopping.

LH: And a new puppy. And our house is almost done. But blah. Okay.

LA: Okay.

LH: Okay, I will definitely keep this.

LA: Okay, thanks a lot. LH.

LH: Bye.

LA: Bye.

[End of interview]

DH Pre

LA: So what does technology in a classroom context mean to you?

DH: Well it's using it as far as my life in planning purposes and me finding information and organizing information as well as aiding students into finding information and using it in the classroom as well. I use it a lot for my lesson plans and lists and stuff like that. But I also help my students to find information in the computer lab. Help them in typing programs as well as organizing our information. And we just started using Kidspiration for the first time in the classroom. So it's an experiment right now. But I think it will be helpful. We were building a character lab and I think it will be helpful for them to see that there are different ways to organize the information in order to write a story or in order to write a report.

LA: Okay. What grade do you teach again?

DH: Third grade.

LA: Can you describe examples of times that you've used technology in your teaching this year?

DH: We're doing a fairytale unit right now in language arts. And I decided that they were finally going to write their own fairytale. And it can be a spin-off from a fairytale that they're familiar with and create their own fractured fairytale. Or they can create a whole new character that has a problem and or conflict and a resolution to the problem and involve magical powers and the numbers, three sevens and twelves that we've talked about as far as fairytales. And so I introduced a lesson on building their character. They kind of missed out a little bit on paper. And to get them familiar with using Kidspiration for reports perhaps later this year, we took that information and made a web using Kidspiration. We're still working on it. It's a new program for both of us we're using. So it's taking a little bit longer than I had anticipated. But they're doing really well.

And they like all the different attributes that they can apply to their web, and change the shapes and change the colors as far as how it looks. And they're probably a little bit more into that than the actually using Word basic[2:31]??? work. So it's been pretty successful so far. But we'll see how it sets them up for writing their story.

LA: When you're designing a lesson that you're going to use technology, and how are you linking the technology and the lesson together? Where do they fit together for you?

DH: I think right away it links, because I need to think, what do I need to do to prepare myself and is it going to be something I'm teaching the children as far as using a specific piece of technology. I need to find the kinks as far as what's going to work and what won't work. And I'm trying to be better about setting myself up with that. Because I've used Kidspiration before. But it definitely has its little quirks as far as shortcuts, or if you click on one wrong thing. So trying to have that set up and trying to have that figured out, you know, at the very beginning of my lesson plan so that I can incorporate that into what I'm explaining to my students. And also we did a WebQuest. We were reading Ramona Forever. We did a WebQuest for Ramona Forever, and it was making sure all those sites worked and I think fine tuning it even throughout the process is important because one of the sites worked perfectly fine for one day, and then it totally [3:59]??? the next day on their laptops in the classroom. It was kind of interesting. I think it's further flushing that out and making sure all the laptops work.

LA: Right, they have all the right plug-ins that they need. Can you tell me in general about the technology that you have available in your school to use in your lessons?

DH: Well we have computers available in our room, and I have my own desktop in my room. But I bring my computer to school a lot of times to use it on my desk. And then we have a computer lab which can sit the whole classroom, I think up to twenty-eight. And then there's overhead laptop cards that have the AV for projecting something onto an overhead. And we also have two laptop carts that have about ten laptops each. And there's a wireless hub that comes with that. So we have pretty good technology available to us throughout the school. So sometimes it's not always working, but it's pretty good. And our technology coordinator is pretty good about making sure that it is working and in working order.

LA: Well what type of assistance have you used in the past to help when it's not working?

DH: I've used other teachers in my grade level (for technology assistance) that have been around in using a specific thing. I've used other teachers throughout the school, whoever I can grab sometimes. And then our technology coordinator is pretty good. IT in the school is a pretty strong background. So that definitely helps, and I've been able to help other teachers when they need problem solving and problem shooting and stuff like that. So that's been pretty good to.

LA: Okay, good. Where do your ideas for using technology in your lessons come from?

DH: I got quite a few ideas at UT as far as using it in language arts for WebQuest and even for math in the WebQuest. And I think some of those things kind of spun-off because as I was looking for specific lessons to use a WebQuest or to use a certain program as far as teaching a lesson, I found a lot online. And so it started at UT to kind of get me thinking in different terms of using computers and using

technology in the classroom. But it's kind of spun from there because I found a lot on my own as well.

LA: Okay. Do you talk to other teachers at your school about…

DH: In fact we use Funbrain for math stuff like when we want to play a fun math game and we project it on the overhead using the laptop cart with the projector. Like I got that idea from other teachers. It's just the time. Sometimes sorting through all the links on our school web site. That is definitely a good place to go, to another teacher. Because I can say, hey, have you used any of the links? Which ones are good and which ones aren't as far as cutting down on the time it takes (to find the good ones).

LA: When you use technology in your lessons, do you feel as though there are different skills that you're drawing upon as a teacher than when you're teaching in a more traditional way? And I don't mean the skills to how you work the program, just your teaching style, what you do as a teacher.

DH: I think so because I think for some of the kids it's a very new concept to be using it to search for information. And I think that they're really quick to want to ask me questions. And I think it forces me to slow them down a little bit and use each other as a resource, which I don't think I do enough in just a day-to-day basis in my regular classroom. And so it either forces them to have a lot more patients or forces us to use each other. Because I'm happy to help them. But there's only one of me, I tell them all the time, and there's twenty of them. I think that it encourages them to think about their problem a little bit more and try to problem solve on their own, and then use other students as well. I found a lot of times they can teach each other a lot more times than I can teach them.

LA: Yeah, they understand the problem closer.

DH: They're able to kind of speak their own language as far as explaining the problem as far as on the computer or finding information.

LA: Okay. Do you consider your specific technology skills with specific applications and programs to be linked to particular subject areas or to be more general? So for example your skill at using inspiration. Like how you integrate inspiration to lessons, is that also intimately tied to how you know how to teach English, or is it more general.

DH: Well inspiration I think is more specific for me to teach English if I had time to use it as far as social studies and science I think it would be very beneficial. But we are very limited on our social study time.

LA: Do you think you would know how to do that? How to use inspiration with social studies?

DH: Yeah, I think so. I think it would be great when we're studying the solar system and I have the kids do their reports. It would be a great way for them to organize it if we had the time. So I think it can definitely cross. But we don't have the time for it.

LA: Okay. Yeah, I know. That's the problem right here. How does technology fit with your teaching style? Comfortably, easily?

DH: Well at the beginning of the year in the first semester it was pretty hard to incorporate it. Especially in the first year of teaching because it seemed like one more thing I would have to completely flush out in addition to my regular lessons.

And I've become more and more comfortable using it. And using it to integrate whether it's information I'm finding for a lesson, and sorting through the massive quantities of returns that I get on a search, or having my kids use the Internet and use different programs on the computer lab. It could become a lot more comfortable. Does that answer your question?

LA: Yes. You're actually starting to lean toward some of the questions I'm going to ask you on the next interview.

DH: Okay.

LA: And we've covered all the ones from this one. Which cohort were you in?

DH: I was in cohort 6 with ----------.

LA: Okay. And that's it.

[End of interview]

KQ-

I think its overall I mean its just not only computer based but it can involve a tape recorder, of course the computer, and I have to think about it in every center of the classroom, there's like a little piece of technology that you could implement in every center and then of course your direct teaching when you are direct teaching with the students you could use some part of technology. It should look this way because it is this way in your home. You use blender, a mixer microwave, you go to the computer, you use the TV the VCR. In every part of the world there's some part of technology so I think that it is how it should look in a classroom.

If you could describe samples of the times you have used technology in your own teaching this year.

Well I just started teaching in Oct in my own classroom
Basically it is just one on one with the software that came on the computer and then of course with the tape recorder and we have done that
With my laptop what I have done is shown a video to the parents and the children I downloaded a movie from the united streaming made by city of Austin on stranger danger we did that in the classroom and then the children watched another movie I downloaded from united streaming
In the science center we have used, no that was it

When you are designing a lesson that is using technology how do you link technology and the lesson, how do they fit together?

Well for that one lesson I did I of course downloaded the video and showed it to them, we did the video from united streaming and we showed that it was towards the end of the lesson at the end of the week we showed the video, at the beginning we read the book and did activities and then at the end saw the video, that was on my computer.

Do they fit together with the content that you are teaching, or is it the tech that you are…?
(the technology and the content are) theme related, it has to fit with the theme we are teaching that week.

Can you tell me in general about the technology you have available to use in your lessons?

It's not a whole lot
It's just a computer that works when it wants to and then its got the software Babies(?) Playhouse on it. Babies(?) playhouse is really good software, ___ concepts___ the children have to initiate it though they have to choose from the menu where they want to __ with it. And so it's not a whole lesson type of thing the children are one on one with me
And then of course they have the tape recorder and the books
That they have at the listening center.

When you did the united streaming was that something you downloaded at home then and brought in?

That (the United Streaming video) was something I downloaded at home and brought in because the classroom that I'm in doesn't allow for a wireless so I couldn't have done it within my classroom. I'm thinking it might be because I can't get a connection in that classroom and the portable is right outside of the main school so I find that kinda weird.

Have you asked anybody that?

No I haven't

Where do your ideas for using technology in your lessons come from?

From what I learned at UT in every class they tried to think about how you could use your computer to teach that lesson so I think just from having that and everytime I'm planning doing my lessonplan I'm thinking about how you could use your computer to teach that lesson so I'm always having that in the back of my mind- is there something in the software program I can have the children use is there something that I can bring in to the classroom using the laptop?

Do you ever talk about your ideas for integrating technology with the other teachers that you work with?

Yes, they are mostly EC teachers so I have talked to them about united streaming I have talked about having the wireless using that but a lot of them don't have laptops so they say we can't really do that if we don't have laptops but I have talked ot my.. because I can't access the wireless inside the office either so I have talked to

So are you giving them ideas or are you sharing ideas and then building on their ideas and then they say..
Yeah they try to work it into their lesson plan

Yes, We have a mentor teacher that gives me ideas in terms of circle times, but they're not really technology related
So then you take those and think of how you can put technology in it?
Yes
So do you teach in a public school?
The site is in a public school we are housed at Dawson but we are not affiliated with AISD, it is a non-profit organization.

What type of assistance have you used in the past to help you with technology related problems? Do they have a help line or anything like that?

No- I can't access the wireless within my portable but I haven't asked why not
Would you know who to ask? At Dawson no
In your own program?
I have asked and they said they would look into it

The one in the classroom I have had problems with and it belongs to AISD and I have told them about how it shuts down when it wants to and they said they would call a tech person that they have hired in a part time basis but she hasn't come in to check it yet
How long ago was that?
Last month.

When you use technology in your lessons do you feel as though there are different skills that you're drawing upon as a teacher that are different than when you teach in a more traditional way?

Skills? I think I draw on background knowledge that I have with computers
I think about the time I didn't know anything about computers and then I think about what I was taught during my student teaching at UT, I think it is a combination of knowledge because and then I think about what other people have taught me, things I didn't get from UT

So are you thinking about what the time before you knew about technology to understand what the kids are going through?

Yes I try to place myself in (the students') shoes how they don't really know too much about technology and I try to think about how I was how I felt when I didn't know too much about it. And then of course like when I was doing student teaching at UT they didn't really teach me about how to fix a problem on my own, I just went to the tech lab or whatever and they would fix it for me but like with my own computer at home there were things I could do to make it work so like the rebooting process and starting it all over

And you try to teach this to the kids

Yes—they see me doing it so sometimes when it does shut down on them they'll push the reset button to try to reset it

Would you say it's been effective for you then this thing of reflecting back on your experiences trying to understand what it's like for them

yes

Do you consider your specific technology skills to be linked to particular subject areas or more general teaching skills

It's more general

Can you elaborate?

(my specifc technology skills are) not tied to one content area it's more of an overall because like I said you can implement technology with different content areas

How does technology fit with your teaching style

Well I think right now with the position that I'm in and I don't really have access to multiple computers it doesn't really fit for me within the classroom except for the one on one with each child and then classroom management creating word banks, creating of course my assessment forms,

What would be the ideal for you if you could have anything?

I think I would have to have multiple computers in the classroom- what it looks like right now is just centers with a computer I could use technology more if I was in that position
What would you do with it?
If I had the time within the day or within the week I think that every student would probably visit the computer at least 3x's a week with a little mini lesson
I'm not sure within the district how realistic it is because they are not focused on it they are more focused on reading and math
Mini lessons meaning what?
You know learning to use the computer, at the beginning of the year, doing research on it.
[End of interview]

KC

Define technology in a classroom
It allows an extra resource for the teacher and the student to be able to answer questions and to have a different type of lesson to be able to see it.

You were describing times you have used technology in your lessons this year

We use it to research questions and topics in general, we do ppt, we do a lot of videos like united streaming, digital cameras to take pictures and then eventually I'll make a yearly scrapbook for the kids to go back and look at
I don't know if this counts but we use a digiscope which is a microscope hooked up to the computer, we use it a lot it connects to the computer so we can do things with the pictures scan it into the computer for later usage

Do they use those pictures from the microscope in projects they do?

Well right now we haven't used them but they have saved them in the computer, my kids are allowed to do one big project every six weeks or so if they want to use those they can- it's optional.

So when designing a lesson using technology how do you link technology and the lesson how do they fit together for you?

A big thing for us is that we use united streaming and power points so when I design a lesson I will go to a website that (the school district has) already made for us and basically they have already made the PowerPoint, I will just have to design my lesson around the PowerPoint sometimes I'll add or take away things I don't like or thing is appropriate for that lesson

With united streaming I'll go in and watch the lesson and make up quizzes for them, questions for them things to go along with it so they are doing something they're not sitting there watching a video

When you are sitting there planning a lesson what is coming first in your mind the technology you're going to use or the content or do they come at the same time?

We have a scope and sequence and so (technology and content) come at the same time, what we should be teaching and what they have offered for the technology they kind of come at the same time
They have for every grade 2-5 for elementary already planned for us

Can you talk in general about the technology that you have available at your school?

Sure, we have COWS- computers on wheels- a laptop connected to a projector, teacher computers, st computers, scanner printers, I have a student in my class who can't write

and he has an apple smart which is a Microsoft document on a small computer and he can print it out.
We have 3 computer labs

Where do your ideas for using tech in your lessons come from?

They have a really good website for those things at my school district

A lot of it I learned at UT—they taught us a bunch of different websites, math websites, science website- a lot of different people have taught me those things.

What type of assistance have you used in the past to help with technology related problems in your classroom?

Last semester we didn't have any technology that could be used in the portable then when we got it had problems- we had a CTS person in our school that would come the same day now he is gone and we have a number that we call and they either tell us how to fix it on the phone or they come the next day.

When you use technology in your lessons do you feel like you are drawing upon different skills/style then when you are teaching more traditionally?

I'm a very laid back teacher you kind of have to with gate kids, I don't know if it changes- I guess it is a little to know that they are following along I have them with me

Do you consider your more specific tech skills to be linked to particular subject areas or to be more general?

I've had a pretty good computer background so I know a lot about the computer, but I only teach math and science so everything that we do technology wise is basically math and science related

How does tech fit with your teaching style?

Yes (Using technology) is very easy because it is something I've always been able to do

In your role you find yourself in as a new teacher do you find yourself helping other teachers with technology?

I have (helped other teachers with technology) a couple of times it's not like they run to me because before me there was a CTS person here who solved all of our problems—I haven't really been needed because we haven't had a lot of computer problems we are pretty well taken care of as far as technology.

Second Interviews

BC Post

LA: Can you describe a lesson that you've taught over the last two weeks where you used ecology. And if there are several to choose from, just please choose the one you think was the best.

A: We were learning about surveys, and we were taking surveys in the classroom with survey boards and kid pens and we took a survey of how the children got to school. And there are about four or five ways that the kids got to school. Walking, driving, etc. And then we represented the data in our math spirals on paper, and then we went to the computer and represent it in a word document. And they chose the representations of the little pictures that you can choose from in Word. And they represent it on the computer and we typed the numbers in and printed it out.

LA: Okay. Why did you decide to use technology in this lesson?

A: I just thought it was a good way to show them different ways to represent that they're doing it on paper, but this way you could also easily do it on the computer. And I thought it would be an easy way to introduce that kind of technology. That was one of the first times I linked technology in the lesson.

LA: So is one of the goals just to introduce the technology?

A: Yes, basically to show them that they could. The first surveys they had been representing so much on paper that there were different ways that we could represent it as well.

LA: Do you think using the computer to represent the surveys in that lesson enhanced the learning effectiveness of the lessons in some way? And if so, in what way?

A: Yeah, I think it enhanced it because it just reaffirmed what they had already done on paper. That they could go to the computer and do that in a different way and use different representation to show the same thing.

LA: If you didn't have those computers available to do that with, what might would you have done with the lesson to extend it more?

A: That's a good question. If I didn't have computers at all, or just not the computers in my room?

LA: At all.

A: I probably would have just continued to do it the way that the IPGs say to do it, was just on paper. We probably wouldn't have extended it.

LA: In what ways did that lesson go as you planned, and in what ways did it not?

A: It went the way I planned that I knew the Word document would lend itself well to representing the survey. The way it didn't go as well as I thought, I would have them do it more. But I realized they needed to be more guided since they didn't have as much experience at the computer, so I kind of had to sit there and kind of do it and they told me what to do and I did it in small groups around one computer.

LA: Like how?

A: Like I sat on the computer and we looked at everything and we kind of voted on what we wanted to do and how many of each picture we would need to represent. And then I actually physically did it. They typed the numbers.

LA: Can you describe any places where it might have been easier or harder to gain access to the technology for that lesson?

A: With the technology I had in my room it was pretty easy to do on these computers. So I guess it would have been a lot harder if I didn't have a computer in the room.

LA: So you did it right in the classroom?

A: Yeah.

LA: Where did you get the idea for this?

A: I just thought of it.

LA: Did you talk to any other teachers about it?

A: I told them I did that. And I also did it because that was my observation for my [3:56]??? for my principle. And so I was trying to think of a way to incorporate technology into a lesson so she could kind of see it all in one lesson. That was when I came up with the idea. And then I told the other teachers I did it, but I don't believe that they did this.

LA: Did they add any suggestions or was it already after you thought it?

A: It was already after I thought it.

LA: What type of preparation did you need to do to get ready for it?

A: It didn't really need a lot of preparation because I'm really familiar with Word. So I just kind of opened the document and had them stand around and just discuss how we were going to choose different representations. Then we just kind of went on and did it.

LA: Can you describe a time when you were planning a lesson together with more experienced teachers and you had an idea of adding a technology. How that conversation went.

A: Normally when we're talking an idea for technology would be like when we were talking about Martin Luther King, to talk about that in social studies. I brought up United Streaming and then everyone was like, yeah, that's a good idea. So we all kind of went our own ways and did our own research on United Streaming. And then we came back and someone was like, oh I found this and it was really good, and I found this. So then we came back and collaborated and chose what we thought was the best one for our age to view.

LA: I would think that your skills of teaching with technology have developed over the school year. How would you describe them now as compared to the beginning of the year? What's changed?

A: Well the beginning of the year, I was having trouble really thinking of a way to implement the use of the computers as much as I wanted them to do in the classroom. It's difficult to implement the rules and procedures. And as the year has gone by I've found methods of using them where the kids are getting able to use the computers every day, like during center time that really works, and I found some really good web sites and some games that I've become more familiar with and the kids have become more familiar with, and they've become more self sufficient on it. So I think more experience with it has given more ideas and talking to other teachers and just learning more things that they could do on there.

LA: Okay. This question is to clarify something that I've noted going over the first interviews. Do you feel UT taught you technology for teaching, or technology alone and you had to figure out how it goes with teaching.

A: I think basically technology alone because when I started using the Mac. I knew nothing about using a Mac. And so it taught me how to use these programs. And some of UT taught me how to use it in the classroom. But it was mostly how to use PowerPoint and how to use iPhoto and iMovie and things like that. And then that kind of lends to giving my ideas of how to use it in my classroom.

LA: So how did you do that? How did you figure out how it worked with teaching?

A: Well like last year when I was subbing, I still worked with some of my kids that I taught with, and I did a little PowerPoint. And once I did the PowerPoint presentation my mentor teacher wanted to do a sort of research project for two of her high readers. So she had them start reading books. And so then I had the idea, well what if we do a little PowerPoint presentation that they can make and find what they think are the important features of whatever animal they were researching and we can make the PowerPoint and they can show it to the class and kind of be able to read it and present it to the class. And so we did that and it turned out really well.

LA: Just from trail and error, just from practicing with it?

A: Basically, yeah. I think PowerPoint is great because you could really use it for anything you want. Anything you want to research you can plug into a slideshow. The idea came pretty easily, and then we just kind of tweaked it once I was working with the kids to find out what they knew and what they thought was important to put in their PowerPoint.

LA: This question maybe should go at the beginning, but I didn't want to influence anyone, so I put it here. What does it mean to teach with technology?

A: I think it means that sometimes I think I normally use technology to extend what I'm expected to teach or whatever is in the IPGs and so forth. And I think it just extends the learning and also gives them opportunity to understand technology and to use it, to show how valuable it can be in their lives.

LA: Which cohort were you in?

A: F.

LA: Finally we have a role-playing activity. If you could imagine you're a teacher teaching a second grade lesson on insects. And I chose second grade just because some people in the study are in fourth, and some are in first as you know. And the next part coming up in on the differences between butterflies and moths. Size, color, patterns, antennae and all that. If you could just think aloud as you think about things you'd want to put in your lesson. They don't have to have anything to do with technology. Just what you would put into your lesson in general.

A: Okay, the differences between butterflies and moths?

LA: Ahem.

A: Well I'd probably start with maybe with what they already knew about those insects. And then for a difference of maybe a key chart or a diagram to show the differences. And then maybe the stuff they have in common in the middle of the diagram. And then I would probably do an extension that would be like a PowerPoint presentation where they would plug in the information once they had it all on paper and decided all the things that were important and maybe make like a little slide show of it. Maybe like take pictures of those insects with digital cameras or something like that.

LA: Nice. Now you're going to prepare a writing lesson for later that same afternoon. So the same thing. Think aloud about things you would like to put into that lesson.

A: Here we always start on the carpet, and I have the chart paper. And I give them whatever the topic is, so whatever I want them to write about, I don't know, the time they saw a moth or butterfly or whatever that's related to that. And then we would just start talking about it, and then I would model writing on the chart paper. Just model the conventions of writing that we expect in first grade. And then they would go back to their seats and they would start writing in their draft book. Then after that we would go through the writing process in conference and then end up publishing on the computer. Obviously not all in one day.

LA: But it would be a piece of that?

A: Yes.

LA: Okay, great.

[End of interview]

KC Post

LA: If you could describe a lesson that you've taught over these last two weeks where you use technology, and if there are several to choose from then just use the one that you think is the best.

KC: We did one on phases of the moon. And there was this web site and it allows you to click different hours, days, and months in the year so you can look at where the moon appears between the sun and the earth. So it allows us to actually see how the moon changes, where it's rotating, and how the earths revolving around the sun. And then it also goes into the different descriptions of the earth, sun, and

moon. It was really interesting because it allows them to see firsthand how the moon actually rotates around the earth, while the earth revolves around the sun.

LA: So why did you decide to use technology with this lesson.

KC: Because I let them see first hand rather than me trying to explain, or draw it, or read about it, they can actually see it.

LA: How did it fit in with the overall lesson?

KC: The overall lesson was actually about the earth's revolution around the sun and the moon's rotation around the earth. And it's hard to explain that to any kind of kid because that's hard concept. We were also talking about the reasons we have seasons and that was part of the lesson. And explaining that in general to anybody is extremely difficult. And so when they can see it, it makes it easier. That's what our whole [1:57]??? been about. It's been about the sun.

LA: Do you think that using technology in this lesson enhanced the learning effectiveness of the lesson?

KC: Absolutely, because all my kids have continued to retain all we've talked about. We can move on from that lesson and go to another. And they can still apply what they learned before and they still understand it.

LA: That's great. What grade are they again?

KC: Forth grade.

LA: That's very good. If you could have that technology available, what do you think you might have done with the lesson instead?

KC: I'd probably have to use three objects. I have a foam sun and a foam earth. But it's very hard because I can't do what the Internet can do as far as showing them the rotation revolution and the different phases of the moon and things like that. I can't show them that, but they can see it on the Internet.

LA: Right, it would have been the old, one child holds a flashlight, another one holds…

KC: Yeah, it would have been five or six people just to do one activity. And they like that, but not everybody would have been able to do it, and here they can actually see it. And they really liked it. They thought it was cool.

LA: In what ways did the lesson go as you planned and in what ways did it not?

KC: Well it went as I planned because it allowed them to take the different hours and the different days. But I didn't expect anything not to happen. I don't think I expected them to get as involved as they did. Because at first I'm just expecting me to do most of the talking, but then they were questioning things and they were getting involved. So I wasn't expecting that at all.

LA: Can you describe any places where it was easier or harder to gain access to the technology you needed for this lesson?

KC: Well yeah. It took me a little while to find a web site because I had the web site and it didn't work originally. That was kind of difficult. And I had to sit there and watch me fiddle with the computer. But after that it was really easy to use. The web site was.

LA: Where did you hear about the web site?

KC: Again, it's part of the curriculum that they give us. They give us options, and most teachers don't use these options, but I [4:06]??? because it's a really good tool.

LA: Did you talk to any other teachers about what you did with them, and did they give you any suggestions or any feedback on it?

KC: No. None of them really used it. I teach [4:21]???. What I do in my classroom pretty much very different than what they do in their classroom. I try to take my stuff above and beyond. And they do what's very basic and minimal.

LA: What type of preparation did you need to do to get ready for this lesson?

KC: Well I had to actually go into the Internet web site and make sure it's appropriate and something my kids could understand. I actually went through an info session of each, the sun, moon, and earth were. You click on it and enhance it and it goes into explaining about each thing. Each, like the sun, and the earth, and the moon, and I went and typed in a sheet for them to follow along just rather than them sitting there. I always have them doing something. So I actually had to go in and type in a data sheet for them to fill out. Things like that.

LA: Can you describe a time when you were planning a lesson plan together with more experienced teachers, and you had an idea for adding in technology? Has that not happened?

KC: Not really, because a lot of the stuff that I plan, I plan on my own pretty much. I really don't plan with anybody.

LA: Thinking about your skill of incorporating technology in your teaching, in what way would you describe this development between the beginning of the year and now?

KC: I definitely use the computer more than I expected at the beginning of the year. Especially when they encourage it. I really don't know what to think.

LA: So who's encouraging it?

KC: The school district.

LA: And so you feel like from the beginning of the year you've been using it more and more?

KC: Yeah, absolutely.

LA: I would imagine its one thing to use it, and it's another to use it well, do you know what I mean?

KC: Yeah.

LA: So do you feel like that skill, the ability to use it well has developed since the beginning of the year?

KC: Not really, because I've always been a very technological person. I've always been very handy in that kind of field. So as far as what they're asking us to do and the things we actually use, my skills are above that.

LA: I guess I'm not thinking of the actual technology skills, but more the teaching skills. How you're using it for your class.

KC: I guess I definitely am improving every day on that. I'm not just using PowerPoint, you know. I use PowerPoint as a baseline and then allowing me and my students expand it from PowerPoint rather than just using it as the main.

LA: So that's the type of development you see in yourself?

KC: Yeah. Rather than just relying on the technology, I can rely that technology is going to be there. And in case it's not, then I know I'm prepared enough to teach

with or without it, either way. So I'm definitely more confident in my teaching skills.

LA: This question is to clarify something that I've noticed in the first interviews. Do you feel UT taught you technology for teaching, or technology alone and you had to figure out how it goes with teaching?

KC: It depends on what class I took. I took a science class you have to take that talks about all the science. That class allowed me to actually experience how to use technology in your teaching. All the other classes I felt like they made us buy this computer and taught kids how to use it, but never really relate it to elementary education.

LA: So who is the science methods teacher?

KC: Mine was --------. I felt like she always stops me on the ball, and she has tons of web sites to use and really cool sites for science videos. Its all very science based. But it's allowing us to use our computer. She really wanted to put our computer to use. And a lot of teachers felt like that was pressure for them. So they just made up things I would never ever do in my class for us to do.

LA: Which cohort were you in?

KC: --.

LA: Who is your coordinator for --?

KC: ---------

LA: So their science teacher was the coordinator.

KC: Yes.

LA: In many ways you had to figure out for yourself how technology fits with teaching.

KC: Yeah. I did because I don't just teach science, I teach math. I stopped using math technology with the exception that we have tons and tons of math kids on the computer. But I have to be more creative in that way and I feel like the lap top initiative they put on us, I feel like that was kind of a bad deal because a lot of my professors don't even know how to use a laptop. The didn't know how to use a computer, yet they were being forced to teach us how to use it. I didn't think that was a good deal.

LA: I'm just thinking about your skills of using technology integrated with your teaching, versus how you were prepared for it. It sounds like you're much more confident and sure with your ability to use technology in your science teaching. But you also say you were the most prepared for it. Would that be a fair statement?

KC: In math?

LA: In science. That you feel more confident in using it in science and that's the one…

KC: Absolutely. Yeah.

LA: So how have you been trying to figure out how technology works with teaching in the other areas, like math? How are you figuring that out?

KC: I try to get on the Internet every chance I can. I have found a couple of web sites where you can do online activities where the kids sit down and do online activities that have to do with the topic we're talking about. But it's very hard to find things on math. So I just have to keep experiencing things on the Internet. I don't use a whole lot of other… I'm not a very big computer person, so that's not my technology tool. I don't really use any other technology a whole lot. So in this class I'm trying to figure what I can do on my computer that will allow my kids to sit down on the computer. Because they have computer once a week. It allows them to experience math in a lot of different ways.

LA: What does it mean to you to teach with technology?

KC: I believe it's not something that I should focus on 100%. I'm not teaching kids about technology, I'm using technology to teach my kids a specific subject. I feel like the technology is an extra tool that allows my kids to see my lesson in a different way. That's pretty much it.

LA: Finally I have a little bit of a role playing activity. If you could imagine you're a teacher teaching a second grade lesson on insects, and I chose second grade because some of the people in the study are teaching fourth, and some are teaching first and pre-k. So it's starting in the middle. And the next part coming up is on the differences between butterflies and moths. Size, color, patterns, shapes of antennae and everything. Could you think aloud as you might be thinking about what you would put into this lesson?

KC: Well the first thing I would use is the microscope that attaches to the computer. A lot of kids like to catch bugs or find bugs that have died and collect them. I had a lot of kids bring things that unfortunately are dead and they want to look at it under the microscope. So I would use that as a tool. And I have printed slides that go on the microscope. One of them is actually a butterfly and coincidently enough is a moth. So I would use that as a tool for my kids to see firsthand what the differences are up close. And then I would let my kids research if they had the Internet pass. I would have them research Austin butterflies on the Internet.

LA: Now you're going to prepare a writing lesson for later that afternoon. So same thing. Think ahead about what you're putting into the lesson.

KC: A writing lesson?

LA: Yes.

KC: What I would do is have them write a butterfly or a moth journal. Have them maybe be with a partner. One write a butterfly journal and one write a butterfly journal. I don't know how I would incorporate that with technology.

LA: You don't have to. I was just wondering what you would do.

KC: We actually did something like that in Julie's class where we watched the process of a caterpillar. We watched it grow and come out to a butterfly. So we actually did a butterfly journal. And I think I may have my kids do something like that for writing.

LA: Okay, that is it for these questions.

[End of interview]

KQ Post

LA: If you could describe a lesson that you've taught over the last week or two where you used technology. And if there's several to choose from, then just choose the one you thought was the best of your lessons.

KQ: We did a lesson where we were focusing on cause and effect for our read aloud. First we started talking about what does that mean, cause and effect. So we introduced it in a way like, I have a cup of water in on hand and the bottle is open. And all of a sudden these kids are running in the hall. What would happen? So

the kid ran into me, that's the cause. What's the effect of the kid running into me. And they gave me different examples. The water is still, it got on the carpet, it fell because the water is on the carpet, it got on their pants and their pants are wet. We went on like that. So then we read a book *If You Give a Pig a Pancake*. We read that, and at the same time I had this huge blown up tree that was like the cause and effect tree. The large portion of it was the cause. The effect was all the leaves. And so we talked about, like okay, if you give a pig a pancake, that was the cause, now what was the effect, which we did. So from there we visualized it and we made, like putting into the leaves thing we did it on the computer where it was on Kidspiration, the other teacher had showed me how to do. And then they gave me the ideas and I would type it in. They would see it on there. And then we kept on going from there and we talked about the same thing. And they went back to their desk and they saw it on the TV, and then they had a physical copy of the cause and effect tree on their desk and they went over the same thing.

LA: So why did you decide to use technology in this lesson?

KQ: Just because it's different. It's a variety of ways of them seeing the information. Because the next day we did it on paper with a different kind of… instead of a tree it was like a domino effect chart. And so I thought for first using it, deciding when you have some things on TV or on technology like computer based they get really excited and I knew they could remember it more if I did that. I do a variety of things. Sometimes technology is first or sometimes I do it at the end as review for the lesson or whatnot.

LA: How did it work with the lesson?

KQ: I think it worked great. They were really excited. The tree that I had drawn on poster paper was big compared to the one that was on the computer and they were like, wow! How did you do that! They were really fascinated by it. The things they could do on the TV or whatnot. I'm not sure if they get that it's computer based. I mean they saw me on the computer doing it, but they were just amazed how it was on the TV when they're used to the TV just being what they watch cartoons on.

LA: Do you think that enhanced the learning somehow?

KQ: Yeah, because they were very engaged in the lesson because they were looking at the TV, it's colorful, it's just different. Just because it was different I know it's something that they'll remember. They think back to it.

LA: If you didn't have that technology available, what do you think you might have done with the lesson?

KQ: I probably would have done it on chart paper that had visual effects that they could see. Because I've used the computer screen that was enormous that said what it is. The next day I also did it off the chart paper and chart it together.

LA: In what ways did this lesson go as it was planned and what ways did it not?

KQ: I think it went the way that I thought. I mean it was a good transition into having it already on my computer because I did that before. So whenever it was time to do that portion of the lesson I just went to my computer, put it on the screen, and there is was. So I didn't have technical computer problems or glitches in that. I think it went the way I wanted it to. I don't think I had any problems.

LA: What type of preparation did you need to get ready for the technology part of it?

KQ: Try to figure out how to make a tree on Kidspiration. The teacher showed us how. She messed with doing different things like that, so it was just me an hour or so trying to get what I want and how will I be able to type during that lesson because I didn't want to have it done, I wanted them to see how I was doing it at the same time as they were writing.

LA: Do you think that you've learned something that you'll reapply in other lessons that you teach?

KQ: Oh yeah. Because I was interested in using Kidspiration during the lesson. Like I've used it to create a paper of a lesson plan. And they were really engaged. Usually to take them to look at the overhead and write, it's just really takes them forever, they're just not really into it. In this way I think it's just different because it's colorful, things were blinking, that kind of thing.

LA: Can you describe a time when you were planning a lesson together with a more experienced teacher and you had an idea for adding a new technology?

KQ: Yeah, I've done it before. We were talking about math and we were talking about shapes, and we wanted to have a real life connection to it. So that's when we did little shapes around our school where we shape everything, or where do we see shapes in things in our every day lives. From there we went into the picture wall with our digital cameras. Not only my class did it. The other classes did it too at different times of the day.

LA: So you planned that lesson idea with another teacher?

KQ: Yeah, I had mentioned it.

LA: And how did the conversation go?

KQ: Well we were really excited because we hadn't done it before. And they were like, you do it, show us, and then we'll follow you after that. They were like, we'll we're not sure about iMovie. They're totally ready to use a digital camera and just put it on the computer. But to do an iMovie they weren't sure about. So I did it, I showed them how, I dragged all the pictures into iMovie and whatnot, edited it. From there they were like, oh it needs… kind of thing. For me it's really easy for me to go and just start doing it. They had to do that in advance. Since we were doing shapes too, I did it the first week. On the second week they did their picture work on Monday so that on Friday they could do their iMovie because they had to learn how to do it. They couldn't just make an iMovie, they needed to mess around with it for a little bit.

LA: And so did they end up using it and making it?

KQ: Yes.

LA: And were they happy with the results?

KQ: Yeah, they were. It could be confusing and they were really… We're watching a movie that we created? Yeah, they were pretty enthused.

LA: So the kids were happy with the results. Were the other teachers happy with the results?

KQ: Yes they were.

LA: I imagine that your skills teaching with technology have developed over the school year from the beginning of the school year to now. How would you describe them now as compared to the beginning of the year? What's changed?

KQ: I think I use it more often. Before I wasn't sure how to integrate them. I think I was afraid it could take more time to plan a lesson, or more time to actually get it going. But now that I've already done several things and used them, I know it's not like a faraway option that I would probably think about while I'm planning.

LA: Do you feel like your effectiveness of teaching with technology has grown at all?

KQ: Yeah, I mean there's some things that I've learned. Like I didn't know about Kidspiration and things like that. I've learned different things I could as technology.

LA: This question is to clarify something that I noticed during the first interviews. Do you feel that UT taught you technology for teaching or technology alone and you had to figure out how it goes with teaching?

KQ: I think both because yes, UT did teach technology, very much so. And then in some of my cooler classes, like the assignments were based in creating a lesson from iMovie. So that also shows me how I can use things.

LA: What do you think it means to teach with technology?

KQ: Integrating several things. Like either a computer based lesson. Like technology being a computer lab or iMovie to enhance the learning. Streaming it to the TV or watching a video or using a digital camera to incorporate data into something. Things like that. Maybe different slideshows of things that we learned. Like the end of last semester we did a slideshow of the things that we had done. They had remembered, oh yeah, we did that. And we were able to go to their prior knowledge. Oh yeah, we did do that. And that was all projector based and on a big screen and things like that.

LA: Now there's a little bit of a role-playing activity. Imagine that you are a teacher teaching a second grade lesson. What grade do you teach again?

KQ: First.

LA: Okay. That you're teaching a second grade lesson on insects. And I've chosen second grade because some people in the study teach fourth and some people teach first and pre-k. And so I wanted to be more in the middle. The next part coming up is going to be a lesson on the differences between butterflies and moths. Different size, color, patterns, antennae, etc. If you could just think aloud as you might think through different activities that you would want to put into this lesson.

KQ: Well I would go with just regular pictures. Like maybe color pictures they could actually hold and see. Then maybe go into lots[12:39]??? of web sites maybe. And we could show them online. There's one where they have butterflies in action, show their butterflies. I'm pretty sure we have butterfly insect videos where they're talking about differences between the two. Maybe if someone had a moth or a butterfly. Have a video camera on it and watching them for a day. Or they could have a science journal where they see different things in the day that they write down. Things that they saw between the butterfly and the moth, what they did, what they looked like, the difference and similarities. Have them give a report to the class.

LA: Now we're going to do a second-grade writing lesson for later that afternoon. So again, just think aloud about what you might want to do there.

KQ: Okay, maybe writing for that day, what were the differences you saw? Was that what you thought would be there? Was that your hypothesis? Was that the real thing that happened that you saw? Butterflies and moths, they can fly. Did you think they could fly? Maybe having them do that. Maybe before they start writing brainstorm an idea. Maybe a web that we created online together. Or maybe our day that we're going to the computer lab, maybe do a lesson where they're creating a web on their own with maybe like diagrams with a moth on one side, a butterfly on the other and they're trying to figure out the size… stuff they're writing. They can start writing about the research they found later observing them through pictures or videos.

LA: Okay.

[End of interview]

KQ Post

LA: Which Cohort were you in?

KQ: Cohort --.

LA: Can you describe a lesson that you've taught over the last two weeks where you've used technology? Were three any?

KQ: No I haven't had any. It's just the one-on-one instruction with controlling the mouse. That's the only instruction we've had. And then of course the tape recorder.

LA: Well let's talk about the lesson on controlling the mouse. Can you describe it a little bit?

KQ: Usually it's one-on-one. And I show them how to position their hand on the mouse and of course the right click and the left click and how the right click is used. And that's the way they move the mouse around to the icon they want to choose. And the older four year olds can pretty much [1:23]??? successfully. But the younger students, no, they can't control that. They're having a hard time.

LA: Do you do that lesson in the context of any game?

KQ: I use it with Bailey's Playhouse. A program they play on.

LA: Can you describe how that goes?

KQ: Usually it's just me and another student. And I sit with them. They have a little bench that goes with the computer. It's a Little Tikes Computer. A Little Tikes setup desk with the computer and the keyboard that's in the desk part of it. They really can't move the keyboard around. It's really attached to the desk. So they use mostly the mouse. We do use Bailey's House and we use the letters. We click onto the little letters before anything. But when it comes to that, when they click on that you automatically have to use the keyboard. And so then they switch from using the mouse to using the keyboard and just punching in the letters.

LA: So are they learning letter identification?

KQ: Yes, they're using letter identification. And when they push the letter it will come up on the screen and it will say the sound of the letter and have little iterations[3:12]??? along with a picture. So that's mostly what we work on when I'm with them. We work on that, and of course I let them have a little free time with it when they get to choose an icon to click on.

LA: And what would happen when they do that?

KQ: Usually they get frustrated because you have to have more control of the mouse and the right click. The older fours stay on longer. They'll stay on maybe about ten to fifty minutes. And that's longer than the three year olds.

LA: So why do you choose to do this with them? Is it required in the curriculum?

KQ: No, it's not required, but I think it's important for them to get on the computer, familiarize themselves with it, and be able to control the right click, left click, and the movement. The position of the arrow on the icon that they want. Just because they're going to need that once they get older and get into the school district, they're going to need to know that and be able to do that.

LA: Yeah. Do the other teachers that teach with you, do they also use the computer with their preschoolers?

KQ: I'm the only preschool teacher. And the program, no, because they don't have access to the computer.

LA: Do you have any other teachers that you talk to about how you're using the computer?

KQ: No.

LA: You sound so isolated. I'm sorry.

KQ: Yeah. My daughter gets some Star Fall all the time, and I wish I had some access to Star Fall in the classroom. It has a lot more. It has the beginning book you need to follow like my older four year old in my classroom would really benefit from the Star Fall program.

LA: And they have the different letters from the alphabet.

KQ: They do have the different letters from the alphabet, but they also have free reading books, free decoding books that she could probably read already. And I have access to that.

LA: And have you seen Sesame Street's web site?

KQ: No.

LA: They have some really interesting games that help to work on special awareness and sorting and patterning and things like that.

KQ: No, I haven't seen the Sesame Street web site.

LA: So you still don't have any success on getting Internet there?

KQ: No. Somehow the computer is set up to where it will only play that program. So when I turn on the computer it will go directly to Bailey's Playhouse. It won't allow me to go to the Internet.

LA: So it's not that you don't have it there.

KQ: Yeah, it's just that the computer is set up that way.

LA: Strange.

KQ: We only have the technology person that comes once a week for an hour to the office. But to get her out there to set the computer to where I should have access to the Internet… I keep on asking and asking, so…

LA: Between how you were maybe even just teaching this one skill of using the mouse at the beginning of the year and how you are doing it now, would you say that your skills have grown or changed in how you're able to communicate what you do?

KQ: It's grown since I began in October.

LA: In what ways?

KQ: I guess the time that I've set aside to do that with them has increased?

LA: Just by your own choice?

KQ: Yes, just by my own choice and classroom management. I redid the whole schedule of the classroom, and so there's a lot more time for me to do that.

LA: How about just your ability to communicate to the students that are understanding technology. Has that developed at all or do you feel like you had that from the beginning?

KQ: Just by going back and forth from Spanish to English. Because they're modeling the Spanish speakers. So going from the explanation in Spanish to they explain it in English and they show it in English. They're using the English terminology. That's the only thing that's changed. And then of course the time.

LA: This question is to clarify something that I noticed during the first interviews. Do you feel that UT taught you that technology for teaching or technology on your own and you had to figure out how it goes with teaching?

KQ: No, I think they taught us how to use technology to teach. I feel like I got that from my study.

LA: Really this one should had been at the beginning of all of these, but I didn't want to influence you. So what does it mean to teach with technology?

KQ: I would have to say that it would be not so much of a challenge, but more of a mindfulness of just having to… When you do your planning you think of ways you can use technology. When you're planning your lessons you think about, okay, what can I possibly do to incorporate technology that would benefit the students. What skill would they be learning if I incorporated the technology into the lesson. And I think it's a careful planning and a careful thought process. It's not a challenging one, it's an awareness that's there that you know they eventually will use. But I guess that's what I can say is what technology is.

LA: And finally we have a little bit of a role playing activity. Imagine that you are a teacher teaching a second grade lesson lessen on insects. And I chose second grade because some of the people in this study teach fourth and some teach much lower grades as you do. And the next part coming up is a lesson on the differences between butterflies and moths. Their different sizes, colors, patterns, they have different types of antennae, all that different kind of stuff. So if you could think aloud as you would think through preparing for this.

KQ: Preparing for teaching the lesson?

LA: Right. So just think aloud where your thought processes would start as you start developing your ideas for this lesson.

KQ: I would probably start with a sign, like a categorization. A VIN[11:44]??? diagram between the differences between butterflies and moths. And then that would be one of my objectives. And then I would probably look into United Streaming. Something hands on.

LA: What do you mean when you say something hands on?

KQ: Something that the children can manipulate that would help them better understand the difference between a moth and a butterfly.

LA: Okay. So you were talking about the United Streaming?

KQ: Yeah. And then that, we'd watch it on the TV. And then find something on United Streaming. I would definitely use that as something that I would use in my classroom. And then of course, you know, actually having the specimens in my classroom. That's something else I would have.

LA: Anything else?

KQ: No.

LA: Now you're going to prepare a writing lesson for later that same afternoon. So think aloud as you go through thinking about what you want to put into that lesson.

KQ: It would probably have to be a paragraph on compare and contrast.

LA: Okay.

KQ: And have them put the actual words that they came up with in trying to describe the difference between a butterfly and a moth and compare and contrast diagram. And I'm thinking four to five sentences. For my older students, maybe six to eight. And of course I would probably use Kid Pix to help them divide their VIN diagrams and then draw from that. Take from that VIN diagram and have them do a draft of their paragraph. Of course depending on the computer skills my students have, eventually have them publish their paragraph.

LA: Okay. Well that is all of my questions.

[End of interview]

LH Interview 2

LA: If you can describe a lesson that you taught over the last two weeks where you used technology, and just talk about the lesson and in what ways you used technology with it.

LH: We've had a miscellaneous project where we read this really cute book. Miscellaneous where this little girl got confused because she missed a week of school and she came back with a spelling test. And she was usually really good at her spelling test. But she had never heard the word miscellaneous before and she thought it was someone's name Ms. Ellaneous.

LA: [Laughs]

LH: And then she made this really cute project. She got really embarrassed and she made this really cute project because forth grade, fifth grade, and third grade all had miscellaneous project where they came up with a word that had third grade did three syllables, fourth grade did four syllables. And we had researched a word. So my kids made PowerPoint presentations, and we're still in the middle of this. We started last Friday. Not last Friday, but the Friday right before kind of thinking about our words. And then they could research online trying to find a word. I mean, they could use dictionaries too, but they could go on and they found it in reading, I found some sites that had some bigger words in it. And they could read those stories or articles and try to find some words. And no one could have the same word, which is the hard part.

LA: Yeah.

LH: And they researched the definition and the origin and they used it in a sentence. The other derivatives of the word, they are going to make a PowerPoint

presentation of the word. And then they're also going to make a project. Like the little girl's miscellaneous project was that she looked up her mothers miscellaneous kitchen drawer and she took all the stuff out of that and glued it on this shirt, and she had this really long cape that had all these miscellaneous items on it. And they're going to make a miscellaneous project like that.

LA: Oh, cute.

LH: And then we're going to have a vocabulary parade during school where you get to show off your word, and they're going to present it to the class, not just to third, fourth, and fifth grade, but to their class, their PowerPoint presentation, which is kind of neat. We haven't gotten that far. A week later we're going to have to finish. Right now they're working on their PowerPoint presentation. And they're pretty cute. They have to be at least 6.5 long and they have to be formatted, they have to include graphics on every side. They have to cite where they got their information. The kids do a really good job.

LA: So why did you decide to use technology with this lesson?

LH: It would be the easiest for me to convey the information through technology. I'm pretty good at technology and I want them to get pretty good at technology. I want it to be something that they don't have to think about. They can just whip at any time they need it. And this is one of the ways we're practicing using technology without specifically saying, okay everybody, now we're going to learn PowerPoint. Now double-click the PowerPoint thing, you know? They're using it to figure it out without step-by-step instructions.

LA: Okay. And how did the technology work with the lesson? Do you think it fit well with it? Was it hard to figure out where it could go with it?

LH: It's going really well in the lesson. The kids are really excited about getting to use the computers and stuff. And some of them are working on their physical projects while the other ones are creating their PowerPoint. We don't have really many computers in the classroom. But they can help each other as partners. Everyone has to have their own project to present, but I don't want to answer every single question. I'm letting them work in partners. So basically two people are doing two projects, but it's because some of my higher students can help some of my lower students figure out how to do some things and help them find something easier.

LA: Right. Do you think that using technology in this lesson has enhanced the learning effectiveness of the lesson in some way? And if so, in what way?

LH: Yeah, I think it's helped. Because it's not just subject matter they're learning. It's the technology that they're learning. And also they really enjoy using the technology. So when they're working with the technology it's easier to slip in the learning and research and this is what words mean. And they had to identify any base words, prefixes, and suffixes, so that was a big one. That was actually the main point of the lesson is we're doing a work-study on base words, prefixes, and suffixes. So of course I leave that one out.

LA: [Laughs] If you didn't have the technology available, what do you think you would have done with the lesson instead?

LH: I probably wouldn't have had them do something else. Because they have to make their physical project, like their [6:32]??? or their poster boards. I'd probably expect more from their physical projects, like those three quarter fold boards. You know what I'm talking about?

LA: Ahem.

LH: The poster boards. And the would have had to present all of that information in a different way.

LA: Okay. Where did you get the idea for using the PowerPoints like this?

LH: I don't know. My mom's a fifth grade teacher and we're pretty good friends with one of the language art teachers in third grade. And we were just kind of talking about it. I don't remember who said it.

LA: Okay. And so it just developed out of a conversation with other teachers?

LH: Yeah. Wouldn't it be fun if blah, blah, blah.

LA: That's great. Then you guys kind of added to each other's ideas as you went on through the discussion?

LH: Yeah.

LA: That's great.

LH: Everybody's doing the vocabulary project, the miscellaneous project. [7:38]??? the vocabulary parade.

LA: Okay. Can you talk about any places where it was easier or harder than you expected to either access or work with the technology for this lesson?

LH: Because we only had three computers it took longer to get what I wanted out of them.

LA: Okay.

LH: The knowledge of the software was what I expected.

LA: Okay. But just the timeframes?

LH: I have other things for them to do for the project. But still to get everything that I want out of them, it's going to take a while.

LA: Yeah, I can imagine with three computers.

LH: Because I have eighteen kids.

LA: Yeah. Okay. I would imagine that since the beginning of the school year your skills with teaching with technology, how your teaching skill with technology has developed. How would you describe it now as compared with the beginning of the year?

LH: At the beginning of the year it took a lot more thought to be prepared, to do a lesson, and think about, well would it be really easier or would it be better for the kids to do it a different way. Or should I make a PowerPoint slide or should I do United Streaming. It took a lot more thought. It's not thoughtless. It's not having to think about it anymore. But it's requiring a lot less energy to kind of gauge what needs to be taught.

LA: Okay. This question is to clarify something that I noticed during the first two interviews when I was reading over them. Do you feel that UT taught you technology for teaching or technology alone and you had to figure out how it goes with teaching?

LH: I don't feel like I really learned a lot of technology at UT. And the only thing that we did with technology that corresponds with teaching that I can remember is in my reading difficulties class we went over some web sites and one of my language arts classes, we did something with Kidspiration. But that was a disaster because we were doing units, and to get inspiration we downloaded it free for three weeks, but we needed it for the whole semester and then you couldn't access it anymore, and everything that you did was lost. It was just awful.

LA: Right. Well which cohort were you in?

LH: Cohort 7.

LA: Okay. Do you think the things that they taught you then was technology standing alone or technology for teaching? The things that they did show you, the web sites, the Kidspiration. Did they show you how to use it in your teaching or did they show you just how to use it and you had to figure out how it goes with teaching?

LH: Well no. I mean the things that they did show us, I guess it was kind of obvious how to do it in your teaching.

LA: Okay. Now I have a little bit sort of a role-playing activity. Imagine that you're a teacher teaching a second grade lesson on insects. And I chose second grade because some of the people are teaching first, and pre-LH, and kindergarten, and some of them are teaching forth and so on. The next part of the lesson that's coming up is on the difference between butterflies and moths. Size, color, patterns, their antennas, they have different shape antennae, all that different kinds of stuff. If you could just sort of think aloud as you would be preparing for this lesson?

LH: I would probably Google it to see what other people have done. To see if there was any sort of story that went along with comparing with either moths or butterflies, or preparing the two. I would go to United Streaming to see if they had any sort of little cartoon or little word building activity. One of the things we really liked about United Streaming was the adjective building. It kind of painted a picture with words. And they have all kinds of little find the differences, interactive programs running on streaming, and go look and see if there's anything on that. I probably wouldn't do a PowerPoint presentation for something like that. I would ask other teachers in my class and see what they had done or what they were thinking about.

LA: Okay. Now we're going to say that you're preparing a writing lesson for later that afternoon. If you could again think aloud as you would go through preparing for that.

LH: A writing activity?

LA: Yes.

LH: If we were just writing a journal entry I would get out the key card. The cart with the little typewriters, because they really like journaling on those. Or we could write or hang it up on the white boards, or we could write in our journal.

LA: Okay, good. Anything else you'd want to throw in? Is that it? I just don't want to cut you off the phone.

LH: And my last question probably should have gone at the beginning, but what does it mean to you to teach with technology?

LA: It means involving a whole other facet of education that you cannot make it without in today's society. You're not going to make it if you're not typing. You're not going to make it if you can't convey information in typewritten rules. And learning the programs now is a lot easier. It's a lot easier for me because I'm more comfortable with typing and writing and doing things like that than I am just writing on the chalkboard. And I feel more prepared with a PowerPoint slide than I do with lesson plans or a book. If you're putting effort into something, if you just see them reading out of a book they were given, it's easier for you to say, why should I put effort into something.

LH: Okay.

LA: And more immediate feedback. Like the expert in [16:10]??? thing with the remote control that you point at the TV.

LH: Ahem.

LA: And you text them together that way. You can see who's missing what question, you can talk about right now, right when they're thinking about it instead of two days later after you grade it and hand it back and go over questions. They'd be interested in it now.

[End of Interview]

MP Post

LA: Can you describe a lesson that you've taught over the last two weeks where you've used technology? And you can go back further than two weeks because, like you said, you were not there.

MP: I guess this was right at two weeks ago. I taught a writing lesson about study development. It was actually a cultivation of a few lessons that I had taught about studying development in writing. And for the last one I used my computer projected onto a TV screen to edit a piece of writing with the students. So I had typed up kind of a boring piece of writing in advance. And then all I did was turn on the TV and put it up on the screen. And then the students were able to incorporate studying development into that piece. I showed them how easily you

could go in on the computer and edit your piece because we've been working on drafting our writing onto the computer instead of doing a handwritten rough draft, actually doing a first draft on the computer. Printing that out, make some changes and going back in and making those changes. So I was able to model that, then they were able to do it.

LA: And why did you decide to use technology in this lesson?

MP: I just think it's the way things are done now really in the world. And it's the way I'm used to doing things. And to me, writing on paper, it's a valuable skill for them, but also, especially with writing out stories and pieces like that, it's very time consuming. I know if they learn to use a computer and become efficient at using a computer, it will save them lots of time to focus on more important things like actually doing the writing and basic ideas of how to make it better.

LA: Do you think that using technology in this lesson enhances the learning effectiveness of this lesson in some way?

MP: Yes I do.

LA: In what way.

MP: Well first of all it adds a component of learning to the lesson. And also I think for some of them to be able to see how easily they can edit their writing on a computer, or adding something, it's a matter of clicking on where you want it to go and typing it in rather than having to weave it into a margin or weave it in between lines and end up with a messy handwritten paper. I think that frees them up to be a little more creative with their writing.

LA: If you didn't have that technology available, what do you think you might have done with the lesson instead?

MP: I probably would have modeled on an overhead transparency just as they would write it on paper. So it would have been a very similar lesson. But you're kind of limited when you're writing on a transparency or paper, you're limited by space. And it shouldn't affect how much you edit or how much you put into your writing, but it does.

LA: In what ways did the lesson go as planned and in what ways did it not? Like were there any places where it was easier or harder than expected to do it.

MP: One thing, I was trying to keep up with making fonts different colors so they could see exactly where I had edited it. And that ended up being more of a hassle

than I had wanted it to. But that was really just a little thing. I thought overall the lesson went very well. One thing that was hard besides the font changing colors was just the whole class trying to involve the students' ideas into editing the piece while still making it something that I was modeling for them. That was difficult for me. But I was able to do a pretty decent job on that.

LA: Good. Where did you get the idea for using technology in this way?

MP: It's something highly encouraged by our principal. I'm pretty sure because they spent the money to buy these hookups for our computer to the TV. So she's always encouraging us to use those. And now that I've become familiar with using it, it's very simple to me. And it's something I do fairly often.

LA: Did you talk to any other teachers about it? Did they offer suggestions?

MP: Yeah. One of the suggestions actually was to change the font color. That was a teacher's suggestion. I had spoke with another teacher, telling her my thoughts saying it sounded like a good lesson and a good idea to do kind of a boring paragraph and then going in and editing the paragraph together.

LA: What type of preparation did you need to do to get ready for this lesson?

MP: I typed paragraphs. I also printed out copies of the paragraph on half a piece of paper. I cut them up and distributed it to students so that they would actually have a copy in their hands. Before we edit it together they could read it right in front of them. So I did that. I typed it ahead of time and printed it out and made enough copies and put them up and everything. And I had also been thinking to myself what are the possible things we could add in here. So I had some ideas in my head. And it wasn't just a single lesson in writing. I did this on Friday a couple of weeks ago where we had spoken on developing studying all week long. So it was in addition to what we were doing all week long.

LA: Can you describe a time when you were planning a lesson together with a more experienced teacher and you had an idea for adding new technologies? Has that ever happened?

MP: Yeah, it has. Not extremely recently. Earlier in the semester we were planning out a unit on industrial revolution and inventors and inventions. And we wanted to create a project that the students would do once a week. We did interviews, social studies, textbook, and all those kind of things. Each student would take on the role of an inventor and learn everything about that inventor and put together some kind of project. So we were looking at project ideas and a few of the ideas that we came up with did involve using technology. Actually all of them to some

extent did use technology where one option was going to be to put together a PowerPoint presentation. A lot of the other options involved using a word processor for some part of it.

LA: I would imagine that your personal skills teaching technology have developed over the school year. Can you describe how they are now as compared to the beginning of the year, what might have changed?

MP: It's hard to say exactly what changed. For lack of a better word, it more has to do with incorporating technology into the actual teaching of how to use it helps the lesson to be a good learning experience for my students. Whereas at the beginning of the school semester I was very… I'm very comfortable with technology and I know how to use a computer and I know how to use a lot of the materials for our science lab and things like that. But I just wasn't used to planning the lesson and incorporating technology for me to use in front of my students and incorporating technology for my students to use.

LA: This question is to clarify something that I've noticed from the first interviews. Do you feel that UT taught you technology for teaching or technology alone and you had to figure out how it fit with teaching?

MP: I think UT taught me a lot of technology and some technology in teaching. But the thing about teaching that I realized this year is that you really have to do it a lot. You can learn a whole lot, but you also have to do it. And I learn through the experience of doing it. I feel like actually having crafted incorporating technology, each time I kind of learn a little something, that that worked, or that didn't work, or I'm definitely going to do that again.

LA: What does it mean to teach with technology?

MP: To me it means to use all resources that are available and to incorporate as much of what's used in the real world into the classroom. It's hard to say that without using the word technology.

LA: Well that's only because you're a fifth grade teacher and you think you shouldn't use the word in a definition.

MP: Probably. People in the real world use computers as a part of their daily lives. So my students should be fluent with using computers in typically all different activities.

LA: Finally we have a little bit of a role-playing activity. If you could imagine you're teaching a second grade lesson on insects. And I chose second grade because

some people in the study teach fourth, fifth, some teach first and pre-k. So it's something in the middle. The next part of the lesson is on the differences between butterflies and moths. Different size, color, patterns, antennae, etc. If you could think aloud of some of the different activities that you would want to put into this lesson.

MP: The first thing that I think is I would want so see if we could get students butterflies and moths in our classroom or in our science lab. At my school that's how it would work. Whether it be preserved or live or both if possibly we could get that. We would use things in the science lab such as microscopes, and we have a microscope camera that we can project onto a TV screen. And can really examine up close the differences in the way that they look. And we would also spend probably books along with Internet and other online resources to research the differences. I would probably come up with a large inquiry chart model and have students look at a variety of sources. They have the hands on source, they have books, and then they have Internet research. To learn about those three things and find the differences and similarities.

LA: Now you're going to prepare for a second grade-writing lesson for later that afternoon. Can you think through activities you might want to do with that writing lesson?

MP: Since we explored all the differences and similarities between butterflies and moths, probably have a writing assignment that would contrast their writing. And I would model that for students. Pre-write with it. You can do a vin diagram or some chart, something like that. Let them use the inquiry lesson earlier to write what they've learned about butterflies and moths.

[End of interview]

Interview with SQ

LA: First of all, thank you for putting in such rich journal entries.

SQ: Oh. [Laughs] I hoped they were. It's so hard to decide what to write. Towards the end they got a little better.

LA: Okay. [laughs] Could you describe a lesson that you have taught over the last to weeks where you have used technology? One that you wrote about, and the journal entries is fine too. And if there are several, choose the one you think is the best. Do you have one in mind?

SQ: Yes.

LA: Okay.

SQ: The one that probably involved the most technology because it was basically a technology lesson about how to use a laptop.

LA: Okay.

SQ: So first decided to talk to the technology representative at our school and just let her know that I wanted to get them started on the laptop. And she kind of gave me some tips and pointers on things to say to them. So I reserved the cart and the laptop mobile laptops online, which was pretty easy. And then brought them all down, hooked everything up, and the kids were so good. I was so surprised because I really didn't think that they'd be ready to handle a laptop because it takes so much coordination to work the mouse. It took me a long time to use a touchpad.

LA: Yeah, that's true.

SQ: And they really did a great job. Discussion about what a laptop is, and what it looks like, and how to open it the right way so they don't hurt the computer. About even the charger with the different colors of lights on the Mac mean. And then they open them all up and they're very careful. And so we turn them on and logged in, which is something that's pretty hard for them because of the underscore. Having them hold down the shift and everything's kind of hard. So we just practice that. And then did some activities with getting used to the mouse, going to the corners of the screen, making circles. And even getting the right finger to use was kind of hard for them because if you had them hold their fingers up in the air and kind of point their pointer finger, and they would have a little bit of trouble with that. But eventually they got it. They loved it. So now every day since then they've been, when are we going to use them again.

LA: [Laughs]

SQ: I want those back. So they were excited and I think they probably went home and told their parents about it.

LA: So where are you planning to go with that?

SQ: Well I think I want to start doing regular programs just in the regular computer lab with the lab tops so that they can still get used to the mouse and are doing games that they're familiar with. And then eventually I want them to start typing

a little bit. Like if they write a story in writer's workshop, maybe make a cover for it with Kidpix and then put a text box with the title and their name.

LA: Okay.

SQ: Trying to get into that.

LA: So why did you decide to move to the laptops when you had the computer lab available?

SQ: Well I just think that since it is such a world of technology and a lot of people have laptops, and I have one. I thought it would be good for them to have a little bit of both.

LA: Okay. Have you taught any lessons where you were using technology to kind of support content?

SQ: Yeah, well that's basically with our writer's workshop and Kidpix.

LA: Okay.

SQ: In the regular lab they hadn't used Kidpix 3X Deluxe before. Some of them had that at home, but this was a newer program. So we had a day of just learning how to use it. And then I told them that we were going to be using whatever picture they made and turning it into a writing sample. So they were going to be writing a story based on whatever they made. So the picture was their inspiration for their story. And everything that they put in that picture as far as characters or background, they were going to have to explain in their writing. Because a lot of times I've been having trouble with them writing more, in writing detail. So I thought if I have them make a picture that has a lot of detail and a lot of things in it, then they're going to have to write about it. Because they love to put a lot of things in those Kidpix pictures.

LA: Okay, so it almost sounds like… I mean I'm trying to think which came first in that. The content or the technology.

SQ: Well I had trouble with them getting the details. I used the Kidpix to help me bring that detail into their writing. Does that make sense?

LA: Yeah. So they really went hand-in-hand.

SQ: Right.

LA: And then from that you were able to develop more of the content it sounds like.

SQ: Right. And we had been learning about the writing process with prewriting and then how to revise the first draft and publish. So we're still working on that right now with that Kidpix picture.

LA: And was that easier or harder than you expected it would be?

SQ: It was easier I think, just because they were pretty enthusiastic about it. Because they each had a different picture and they got to put it out, which they didn't always get to do.

LA: Did you talk to any other teachers about your ideas for either of those lessons?

SQ: Yeah, I shared it with the team.

LA: And what did they think?

SQ: They like it too. I have one other teacher that's doing the same thing.

LA: Did you talk to them about it before you started it or when it was done? I'm just wondering if they added suggestions that you could incorporate.

SQ: I had the idea and then I told them after I got the idea, but before I did the lesson.

LA: Did they add anything to it?

SQ: Well we thought that we could also do word problems. Because in their final portfolios, like there's a day towards the end of the year where we keep samples of their work all throughout the month. Like three samples maybe per month. And one of those has to be technology. So we were trying to think of names that we could do to put in their portfolio so that would work.

LA: Okay. I have here, describe a time when you were planning lessons together with more experienced teachers and had an idea for adding a new technology, which is kind of what you just talked about.

SQ: Right.

LA: How did the conversation go?

SQ: Well I think I had put in a Kidpix lesson when I reserved the computer lab. And so I think I had to have help on how to reserve it. So someone came in and they

were asking me what I was planning to do. And I think they just had our planning at our regular day during the week. And I hadn't mentioned because it was written in my plan book that I was going to do a story based off of their picture.

LA: Okay. Well let's assume your skills with technology have developed over the school year. How would they be now as compared to the beginning of the year. What would you say has changed.

SQ: Just how I use it in my lessons you mean?

LA: How good you are at putting technology with teaching.

SQ: I think it's better just because I know more and like I said, I'm in the technology committee for the school. So I'm the representative from first grade. So I have to pass on whatever I learn from the meetings to the rest of the team. And I think just learning about the new programs there makes me want to use them because I know about them. I think at the beginning of the year it was harder because I didn't know a lot about the things they had available.

LA: Okay. That would make sense. You start out by saying that you've learned a lot. Do you feel like you've learned a lot, like you just finished up saying in the technology that's available or was it in some other area that you've learned a lot?

SQ: Well I think either by doing these things this late in the year, I think I would next year start them a lot earlier. Just kind of learn from mistakes or things I could improve upon.

LA: What areas are those in?

SQ: I was thinking of the laptop lesson. I wish I would have done that at the very beginning because they got to look back at some of the basics of how to use a computer, whereas it would have been much better at the beginning of the year than just now.

LA: So you feel like you've learned where these things fit better in the development of your students?

SQ: Right, yes.

LA: Okay. This question is to clarify something I've noticed when I was reading over all my first interviews. Do you feel UT taught you technology for teaching or technology alone and you had to figure out how it goes with teaching.

SQ: Definitely the second part. Technology alone, and then I had to figure out how to put it in.

LA: And so how did you do that? How did you figure that out?

SQ: Well just a lot of the programs. I knew how to use a Mac because of UT. I would have never been on a Mac if it hadn't been for that initiative. So I was lucky to be familiar with it by the time I got into the schools, which was very helpful. But at the same time we never really explored any of the programs or how to use them. We did use iMovie, but I haven't figured out how to use that in a first grade classroom yet. So they didn't really explain to us how to use iMovie in a classroom. I just kind of have to figure it out on my own. But I did learn how to use iMovie at UT.

LA: So how did you figure out how it would work in the classroom? Just trail and error?

SQ: Yes.

LA: Okay [laughs]. I guess that's what I was trying to get at, with the thing of how have you grown from the beginning of the year.

SQ: Yeah. I think just trying to see where it would improve their learning too. I mean they have trouble sometimes drawing pictures for addition and subtraction. Well I could just take them onto a computer and they could do it really quickly.

LA: Right. Okay. I have two little scenarios. Imagine that you are a teacher teaching a second grade lesson on insects. I choose second grade because some of the people in the study are in fourth, and second, first, and pre-k, so I was trying to go in the middle. The next part of the lesson is on the difference between butterflies and moths. Different sizes, colors, patterns, antennae, all that. Could you think aloud as you think about how you would go about preparing for this lesson.

SQ: And it's all using technology?

LA: Whatever you would teach for them. Whatever you would do normally. It doesn't have to have any technology in it if you don't feel like you would do that.

SQ: Well we did do butterflies in first grade as the lifecycle of an insect. And I used my digiscope that I got from UT to show them the wings. So as I was trying to talk about patterns, I could show them the little scales on the wings through the digiscope, which I did. And if I was talking about the moth I could probably put the antennae because one of them has a ball at the end and one doesn't, right?

LA: Yeah.

SQ: That would be easy to see on a microscope. I would also bring in examples. I had a butterfly I had in a little container that I brought in so I could bring in a butterfly and a moth and make it compare. We could do then a diagram. We could also do a diagram on Kidspiration. Just make a little booklet for facts, kind of like note taking for primary where you just make a little booklet and we could have facts about each one. Draw pictures of the patterns and different types.

LA: Okay. Now you're going to prepare for a writing lesson for later that afternoon. So go ahead and do the think aloud again as you're thinking through that.

SQ: Okay. Well I do pre-writing, so we could go through all the steps of the writing process where we could just brainstorm different things to write about. Different types of stories. Maybe we could have a non-fiction story where we would just have facts that were temporized. Or we could have a fiction story where it was actually like a butterfly talk or something where we could talk about the different ways to do that. And then sketch them out through some kind of organizer, and get a first draft and revise.

LA: Okay. And then my final question for you this time, which maybe should have been the first one, but I didn't want to influence you. Is, what does it mean to teach with technology?

SQ: I think to use technology where it makes learning easier. And I think lots of times technology is there to show things more realistically maybe and explore things deeper than you can in the classroom. So I think teaching with technology is just helping children. Like the Internet you can go out and see all these different things in the classroom that you normally wouldn't be able to see.

LA: Okay. So it brings sort of the world into them?

SQ: Right.

LA: Okay. Sounds great.

[End of interview]

UL

LA: If you could describe a lesson that you've taught over the last couple of weeks where you've used technology, and if there is several to choose from, just choose the one you think was the best.

UL: I was teaching a lesson yesterday that was talking about history. The revolutionary war or events just after it. It involved the constitution. I linked up my laptop to the projector and used some videos from United Streaming to kind of reemphasize my points to them. The kids were excited to see it on the screen, absorb a little more information than what I was telling them.

LA: Why did you decide to use technology that way?

UL: Basically the same reason. Have another view of something rather than just hearing me talk about it or reading a book. They can actually see it and see something displayed to them that gives a visual idea of what was going on.

LA: In what way do you think those videos enhance the learning effectiveness of your lesson?

UL: I know a lot of my kids are more visual than they are just processing. So the fact that they could actually see something and get an idea of what it was like back then. I think it helps give a deeper understanding of it. So I think the video helped with that.

LA: If you didn't have that type of technology available, what do you think you might have done instead?

UL: I guess try some hands on projects. See what I could figure out to do to make them believe they're back in that time period and kind of reflect in a journal based on that person's point of view.

LA: In what ways did that go as you planned for it to and in what ways did it not? Was it harder, easier than you expected for it to work?

UL: Well the kids were happy I was using the computer to begin with because I don't get a chance to use it that often. So they could actually see what they could find on the Internet rather than just computer games. The only drawback was trying to find assessment virtues out of it. Because the videos sometimes have questions at the end, which they have to answer. But they need to make sure they're paying attention and not trying to dose off. So to all the kids I teach social studies, that's one of the things about it. But they get more interested if [2:16]??? show them that.

LA: And so how did that go? Were you able to find what you need to make it work the way you wanted it to?

UL: Yeah, it worked great. Like I said, it was basically used to reemphasize some points I was trying to make. They understood it.

LA: Where did you get the idea to use those videos?

UL: UT. I got signed onto an account back when I was a student. I've been trying to use it ever since.

LA: Did you talk to any other teachers about this idea? Did they give any suggestions?

UL: Yeah, a lot of the teachers like United Streaming, it's just that a lot of them don't seem to use technology as much. We're getting a pretty young crop of teachers at my school, so they're starting to use technology a little more. Plus you have UT teachers come every now and then. Interns.

LA: Does that help?

UL: I think so.

LA: In what way?

UL: I think it's kind of getting away from regular bookwork and actually giving them something else. Another way of showing them something.

LA: When they have interns in the classroom?

UL: Well in interns bring fresh ideas to the school as well. Like I remember when I was an intern just last year. The ideas I was bringing from college to that classroom, I was teaching with teachers that taught for twenty years. Most of them have never seen before. So I think it's bringing something new to old lessons.

LA: Are the teachers pretty open to the ideas that they get from you or from their interns?

UL: Yeah, they're interested to see what we're learning in college how we should be teaching now. There're interested in new ideas.

LA: Good. Can you describe a time when you're planning a lesson together with a more experienced teacher and having an idea for adding a new technology?

UL: I guess on my team, like we have one better teacher than myself. And the new teacher next door, she's in her mid twenties as well. So we kind of talk with her. And she has ideas for herself really just using web site help to look up some points or research. Even she is kind of limited because she's been teaching for about fifteen years and hasn't really gone through the technology training we had. So I kind of bring up to her the web sites or sources we can pull up or just fresh ideas I seem to get. And she seems to be very open to it.

LA: Between the two of you, you kind of push her that way?

UL: We don't push her. We kind of see what she thinks because she's been teaching a lot longer than we have. So I feel like she knows more than I do about certain stuff. So I can just run ideas by her and see what she thinks. And then I kind of demonstrate it for her and she says, okay, go with it.

LA: And when you say what she thinks, you mean what she thinks about if it will work or if it will help with learning?

UL: More if it's going to totally tank or whatever she thinks.

LA: I would imagine your skills as a teacher teaching with technology have developed over the school year as you've had more opportunity to use them. How would you describe them now compared to how they were at the beginning of the year? What's changed?

UL: I guess now I'm just trying to find new ways to make points. So I've not been using technology in my last semester because I didn't have the resources to or I didn't feel the kids would understand it as much. But now that some of the pressure of TAKS is leaving them, and they're open to new ideas, it helps me get some new points across that I didn't think I could in the past. So I think it's an opportunity if we try something new with them and see if it works.

LA: Well what about your understanding of how they learn and how it can fit with their learning? Anything you feel has changed at all?

UL: I wouldn't say it changed yet because I haven't gotten a chance to really emphasize technology. A lot of kids don't even know Internet or know how to use it very well. So I'm still trying to show them that. So I think as I learn more myself how to instruct technology with them that it will be more effective to them.

LA: Okay. This question is to clarify something that I noticed going over the first interviews. Do you feel UT taught you technology for teaching, or technology alone and you had to figure out how it goes with teaching.

UL: Really to be honest, the whole laptop initiative I thought they didn't really have any good use of the laptop because in all honesty we never really use the laptop in class. Like there's one or two classes where she's like, okay, well look on the Internet to do this. But most of it was lecture based. So I felt like they gave us the technology to use and stuff we could use, but didn't really show us how to implement it. I felt we really didn't need the laptop when we did the education program because I don't think the teachers really knew what to do with it.

LA: Okay. The professors that you had or the teachers in the schools?

UL: I think it was the professors. They weren't sure how to use their laptops to do the class. The only teacher I think that actually made us use our laptop was July Jackson. That's because she made us do lessons on the Internet to represent to the class.

LA: She was a science methods teacher?

UL: Yeah.

LA: Did she give you all digiscopes?

UL: Yes.

LA: I've heard other people talk about her too.

UL: She gave us all a free digiscope, and I actually use that in my class as well.

LA: So if you then had to figure out for yourself how to fit technology with teaching, how did you do that?

UL: Well I used all the resources they gave me. Like United Streaming or Atomic Learning. And just kind of looked on United Streaming to see if there's anything to accommodate what I teach. And if they did, I try to work that into my lesson so I can present it to my class.

LA: What does it mean to you to teach with technology.

UL: I'm not real sure. I just think it's a new way of teaching. I think it's just trying to get away from a traditional method and just trying something more up to date.

Our culture now is very technology based. Videogames or whatever it is. Or computer games. Whatever they like. It's just a new way to do something that's more current than what has been in the past.

LA: And now I have a little bit of a role-playing activity. If you could imagine you are a teacher teaching a second grade lesson on insects. And I chose second grade because some of the people in the study are teaching fourth or fifth, and some teach first and pre-k even. And the next part coming up is going to be a lesson on the differences between butterflies and moths. Size, color, patterns, antennae, etc. If you could just think aloud of some of the different activities you think you might like to include in such a lesson.

UL: I would probably find different types of videos on United Streaming about butterflies or moths. I would try to find some interactive web sites that show you how to compare the two if it's very child friendly to their age. I would show them, like what's on this thing, it will show a butterfly or what it can do. Click on another one to show the moth and its qualities. And kind of a compare and contrast activity and have them use that so they could do a write up or something like that.

LA: Now you're going to prepare a writing lesson for later that afternoon. What activities might you want to put in your writing lesson?

UL: I guess they could use them to compare and contrast once I have them use that web site. They can see the differences. They can use that to try to write up what they think are the differences between butterflies and moths. And after they've written it and we've all checked it and everything, they can go on the computer again and actually type it out and publish it.

LA: Okay. Which cohort were you in?

UL: I was in 3.

[End of recording]

Vanette Post

LA: So for this one if you could describe a lesson that you've taught over the last couple of weeks where you used technology. And if there are several to choose from, just choose the one that you feel is the best.

WI: Well I did the past couple of weeks. Didn't get to do them all, but I think what I told you about [0:30]???. But then what I did is just kind of talking about holidays and traditions, that was in social studies. And on Groundhog's day I showed them some… Though they didn't even know what a groundhog looked like, so we talked about it and we would look up online and how it's going to be. I looked at some pictures of groundhogs and some information about it and read it to them. And some clips. You can go to little short video clips of groundhogs, and just the tradition of it and how it got started, the history of it. And they found that really really interesting. So I did that. And the ideas that I had were, one they were talking about the rainforest. And I wanted to look up some pictures of real rainforests online. And we didn't get to do that, but that and soil and rocks were another unit that we were doing, and I thought that would be good to show just different types of pictures. Because sometimes they don't have the books or the resources in my room and it's just good to have the Internet where they can see it and quickly search something.

LA: So why in this lesson did you decide to use technology?

WI: Just because I felt like they… Well basically because I didn't have any books. I didn't have the resources available in my room. And I that would be a fast way they could get pictures. And I guess that's really why. If I had had books I might have used it, but I didn't have any on that. As a first year teacher I don't have as many resources as I would like, so the technology really comes at hand.

LA: Okay. Do you think that technology in this lesson enhanced the learning effectiveness of the lesson in some way?

WI: Like I say, I could do a lesson, it was just as effective to have a book or talking about the traditions of Groundhog's Day and have pictures. You know it probably would have the same effect. The only extra thing it had on the Internet was video clips. So that made it seem more about, you know, just what the groundhog is like.

LA: Could you describe any places like this where it might have been easier or more difficult than you expected to gain access to the images and the little clips of the groundhog's?

WI: It was very easy. I just searched it and multiple web sites came up. And it was very fast.

LA: Did you talk to any of the other teachers you work with about it?

WI: No, I didn't.

LA: Will you, or not? I'm just curious.

WI: Well probably not, because it was actually kind of, as far as the moment wasn't, because we were talking about February 2nd and the more we talked the more we realized how much they didn't know about groundhog, and day and what it was. So just as a teacher I was learning from my students what they're familiar with and what they're not. And sometimes in teaching that's what happens. So we'll go off in small tangents about something you weren't planned for. So it was a kind of a spur of the moment thing. It wasn't planned in the lesson plan. But that's the neat thing about teaching and technology, and you can make a little mini-lesson just within another lesson.

LA: Yeah. Great. Can you describe a time when you were planning a lesson together with more experienced teachers and you had an idea for adding in technology?

WI: Probably the rainforest idea. We were studying the rainforest and they had pictures and worksheets and things like that. And so I kind of share with them the idea that it might be neat to look on the Internet if we don't have pictures in our room. Just show them real life pictures of the rainforest and their sounds and stuff like that.

LA: Okay. And how did that conversation go? How did they react to that idea?

WI: They thought it was a good idea. One of the other teachers that's new as well, she wanted to know what web sites. Because I found some and she wanted to know what they were. Pretty useful ideas.

LA: Okay. How has your skills teaching with technology have developed over the school year? From how they were in September August to how they are now?

WI: Well in some areas I feel more weak. Like as far as PowerPoint presentation goes, I had forgotten how to do that. So I had to re-teach myself. But as far as some other things I feel more competent at. Like since I'd never known how to hook up certain devices with the computer and the TV and how to get it to show to the whole class. United Streaming was something I was introduced to and look where you can find small clips of whatever you're studying. Video clips for your lessons. There's things I went over. There's things that I have kind of forgotten a little bit too.

LA: What about what you might consider your sort of teaching skill with integrating technology into how you teach? Do you feel like that's developed at all from the beginning of the year?

WI: Yes I do, from the beginning. In the beginning I wasn't really thinking, how can I extend this lesson as much and how can I integrate technology. And now I'm getting more comfortable having things down more and I can kind of think about where can I put some of the technology in, or where… how can we extend this or make the entire level[7:15]???. And so I am thinking more about that kind of stuff than I was in the beginning of the year. So I feel like it's improved.

LA: Okay. So what part of that would you say has improved? Just how you're thinking about it, or how often you see opportunities for it?

WI: Yes, both.

LA: How you actually go about doing it?

WI: Yeah. Going about doing it. Seeing the opportunities to use it.

LA: Okay. This question is to clarify something that I've noticed during the first interviews. Do you think that UT taught you technology for teaching or technology alone and you had to figure out how it goes with teaching?

WI: Yeah, I guess I kind of think about how it fits with teaching?

LA: That they taught you that how it fits with teaching or you had to figure that out?

WI: No, not really.

LA: So how did you go about figuring that out.

WI: Well I guess basically when we're in planning we don't plan how am I going to integrate technology. So that's why it was just one of those extra things. But now I'm just realizing the importance of it and how I can make the lessons better. So when you're planning you integrate it and make it fit I guess you could say.

LA: Okay, that makes sense. This question maybe should have gone at the beginning. To you what does it mean to teach with technology?

WI: Just being able to access different resources and materials faster in that maybe you don't have them at school or in your classroom. And just being able to teach showing the students different skills, and showing students different computer skills, and it's showing them the importance of technology, and that there's so much information you can find on the Internet that maybe you would never find if you were just in the classroom.

LA: Okay. By the way, what was the letter of the cohort you were in?

WI: 7.

LA: Okay. Imagine that you are a teacher teaching a second grade lesson on insects. I've chosen second grade because some of you in this study teach fourth grade and some teach first and pre-k. The next part coming up is a lesson on the differences between butterflies and moths. Different sizes, colors, patterns, antennae, etc. Think aloud as you think through your thoughts of preparing for this lesson, what you want to do in the lesson. And just think those aloud for us.

WI: Okay, well I would probably read books on both insects and moths and butterflies. Probably read books on them and probably do, in our school, in our district, thinking maps are really big. So I probably would do a double bubble comparing as a class. Comparing butterflies and moths. Then I would probably have them do a practice doing maybe their own double bubble. That could be one day doing their own double bubble at their desk, compare and contrast which is a good prewriting activity. And then they can maybe research it a little further on the computer about the differences and similarities and add that to their double bubble and come up with a research paper.

LA: Okay. Well in fact I was going to say the next part is that now you're preparing for the writing lesson later that afternoon, but it sounds like you already incorporated a lot of that into the first lesson. Okay. Is there anything else you want to add to it?

WI: Well, just a presentation, researching it and going through the writing process as well. And maybe just having a presentation with the paper and maybe a poster to present to the class.

LA: Okay.

[End of interview]

JOURNALS

UL Journal-

Unfortunately I was unable to really use technology in my lesson as we were spending most of the week preparing for the reading TAKS test that took place on Feb. 21. We were, however, doing a science project discussing types of consumers and examples of herbivores, carnivores, and omnivores. Students were asking me if their animals were examples of each, so the students and I got on nettrekker.com and looked up the animal and its diet. Students continued to ask me if they could look up their animals too, so I let the students get on the computer 6 at a time and research their animals. All my math lessons came from the investigations books, so we did not get on the computer or use technology.

Mon - No use of technology today due to prepping for taks reading._

Tues - TAKS Reading..._

Wed - We continued our producers and consumers project using nettrekker.com to research animals and their diets. We also listened to the computer to an old radio broadcast of War of the Worlds by Orson Welles. The students had read a TAKS practice test about Welles and were interested in the broadcast so we looked it up online.

Thurs - I used unitedstreaming.com and some videos to talk about the Constitution and the after effects of it. It was nice to use as students got an alternate view of this topic instead of just reading from the text book. Students enjoyed getting to see the video from the computer and I felt get deeper knowledge on the subject.

SQ Journal-

Addition and Subtraction

We used a Math program for addition and subtraction in the regular computer lab today. Luckily it was only my class and not two classes like usual. It gets really crowded and chaotic with two groups of first graders. I looked on the student desktop to research some programs that I could use and found one that used two digit number addition. The sound effects got the students interested and they were able to use their headphones. I showed them how to play two different games on the projector before they began to play. The directions for the game were also on audio in the program. We played for about 20 minutes after directions were given. I especially like to use the computer lab for math games. I need to add some online math games to my website so the students can access them at home. I think the program helped them understand how to add the ones column and then the tens column. We have been talking about place value this week in the classroom and use two digit addition and subtraction daily with our morning math practice. The game also had them put numbers in order from greatest to least which is a skill for this nine weeks.

Laptops and First Graders -

Today was Technology Day in my first grade class! Never would I have imagined that first graders could handle using laptops without throwing them across the room. Yet, I was proved wrong today! I checked out the mobile laptop cart and projector to give a beginning lesson on how to use Mac laptops. They were extremely excited and did a wonderful job being careful with the equipment. With the help of the technology representative assigned to my school the students learned what a laptop was. I explained the outside of the laptop, location of the open latch, and how the apple should be upside down when you open the screen. These students are going to be much more ready for the technology world than I ever was! They must know how to push the power button and wait 15 seconds for the screen to light up. They all counted outloud and it was like a race to them. Then we talked about how to login. Logins are not easy for first graders especially

because they have trouble with the underscore. I had imagined that the mouse would be very difficult. It takes a lot of coordination to move one finger on the mouse and one to click. They did much better that I expected. We practiced moving the mouse from corner to corner across the screen. I found that games/challenges really got them interested. We learned about menus, desktops, the mouse, safari, and docks. The lesson took about an hour and fifteen minutes. I explained that applications should not have a black arrow except for the Finder and why. We learned that a computer can be put to sleep or turned off completely. I know that my class will be begging to use the laptops again soon. I think that just using the laptops as opposed to the regular computer lab will motivate them to learn about technology. The airport in the room did cause some trouble with logins, but other than that, I didn't encounter many problems. Reserving the cart and projector was all done online with no problem. Now that I have them interested, my new job will be to think of more activities using the laptops. It is a lot of equipment to handle. It would be nice to have a text book or activity book with ideas for lessons. I think I might make a page with technology vocabulary that we learned today to keep the terms fresh in their minds.

Writing stories with Kidpix -

We started our prewriting (pictures for the beginning, middle, and end) of the Kidpix prompt picture today. They used the printout of the Kidpix picture they created previously to be their inspiration for a story. I had them look at the picture which looked very professional to help them create a story. They had to figure out why every "sticker' they put on the picture was there and why they were in the setting they chose on the computer. I was extremely impressed with the ideas they came up with! I don't think that I would have had such a great result with just a hand drawing. The computer program allowed them to go above and beyond what they normally would have created. I counseled individually with them once they

finished the prewriting pictures so that then they could begin writing some rough sentences for the beginning, middle, and end. I am anxious for the final product. I am thinking that we will go back into the lab to add titles and perhaps more illustrations. This idea for a lesson was not taught to me, but after seeing the Kidpix program I thought it was worth a try. I would like to do the same for a math story problem.

Printing Kidpix -

Jan. 13th-This week they were on their own to create a picture to be their inspiration for a writing piece. I reminded them of their assignment and how every picture or stamp must be related to what you are going to write. I also told them that it would be smart not to add too many stamps because they all must be characters in their writing. Many students wanted to use the background of a baby's face which I had not expected. I had to ask the class what the "setting" of a story was to keep them looking for backgrounds with scenery. Occassionally, I had computer trouble where they would freeze up. I have one other teacher with her class in the room so it is a mad scramble to help everyone with their hands raised and fix frozen computers. Often I do not know the best way to fix them. It sure would be nice to have a technology representative in the computer lab. Then once students decided they were ready to print I had to think about whether or not to teach them how to print and change printer locations or just have them raise their hands and I would do it myself. I decided that if I taught them how they would print when they were not supposed to, so I ran around to everyone to print. The students loved seeing their pictures on printouts and are excited to write about them next week.

KM Journal-

Technology is not a big part of lessons taught throughout the day. The students are allowed access to a program Bailey's Playhouse during free centers. I have not allotted

personal instructional time with the computer. I would like to. I work with the students in groups on phonemic awareness, letter knowledge, and vocabulary.

LH Journal-

Monday-Students chose words and reported to me. If I approved the word, the students researched meaning, origin, base word, suffix, prefix, and derivatives of the word. -CLA

http://www.manatee.k12.fl.us/sites/elementary/palmasola/wawt1.htm (focus-author's purpose) - AR Test

Tuesday- Work on vocabulary disaster ppt project and costume. -CLA-AR Tests

Wednesday--Work on vocabulary disaster ppt project and costume. -CLA-AR Tests

Thursday-- Work on vocabulary disaster ppt project and costume. -CLA-AR Tests

Friday- No School - In-service

• Tuesday January 17, 2006o Students took AR testso Students were introduced to this week's CLA (computer learning activity) as a center to do when all other work is finished. This week's emphasis- subject verb agreement. Website: http://www.bbc.co.uk/skillswise/words/grammar/sentencebasics/verbsubjectagreement/game.shtml

•Wednesday, January 18, 2006oI plugged in my digital camera and showed students pictures of my new puppy. o In reading How To Eat Fried Worms, the class and I did not understand the word deracinate (pg. 36), so a student looked it up for us on dictionary.com. o We went to the computer lab for SRA._o Students continue to take AR tests, but no one has reached the CLA.

•Thursday, January 19, 2006o We spent A Lot of time going over a TAKS writing practice that we should have done a better job on. I would have been nice to direct teach this with the remote control system question by question instead of correct

teach it three days later. o Students continue to take AR tests, and some are participating in the CLA.

• Friday, January 20,2006o I introduced out next big project. The Ms. Aleaneous Project. I asked students to start thinking about a four syllable word and its meaning during their free time in class and over the weekend. This project has a mandatory seven slide minimum power point presentation. Students researched four syllable words on excite and used dictionary.com to research the meanings. o ARo CLA

WI Journal-

This week in my first grade class, we have been reading the big book, The Napping House, by Audrey Wood. The book is about different people and animals napping on one bed, which is great for a sequencing activity. However, I wanted a way to get their attention before starting the lesson. I decided to do a powerpoint presentation with pictures of different animals and people sleeping, and I made them figure out what they all had in commmon. After discovering that they were all sleeping, I decided to a do a circle map to think of other words for sleeping (such as napping) to tie that in with the story because I wasn't sure if they were familiar with that vocabulary. They power point presentation defintely got the children's attention and I saw that they were more eager to participate in the lesson. I discovered that even the smallest things (like pictures)can make a big difference in a lesson, and that children really appreciate visuals.

Another activity I did with my students involving technology was very simple yet very exciting. On Feb. 2, we talked about the history of Groundhog Day and its traditions. I knew that alot of my children were not familiar with the groundhog and probably had never seen one before, so I went on the computer and searched for different articles, pictures and even videos on groundhogs. It was very

interesting and even I learned a lot about the groundhog. I realized after that just how convenient and resourceful the internet really is in your classroom, because sometimes we do not have pictures available for the topic we are discussing. The internet (with the VGA) device is a fast and effective way to introduce or top off a lesson.

Another thing we studied this past week was rocks and soil. We went to the lab and the children were able to explore with all different types of rocks. I did not get the chance to o this, but I did think how next time (maybe with a higher level grade) it would be good to have children research their favorite rock and present their information to the class. Even if I cannot do this with all of my students, then maybe for my higher-level ones. I realized that the internet other programs are a great way to extend lessons for those who need more challenge in the classroom.

BC Journal—

Representing survey results:

students learned how to take surveys and we practiced numerous times representing these surveys on paper. then i decided to use the computers to represent the surveys. i decided to do a class survey together. we took a survey on how our class gets to school. there were about 5 different ways that kids got to school in the morning. then i decided to pull small groups to come to my computer. the students were to pick a representation (stars, smiley faces, etc...) as a group. once they picked their representation for each way to get to school, we talked about the numbers and how many of each representation they would need. i started having the students physically do it on the computer, but i quickly realized that it wasn't going to work. they had not had enough experience with the computer, let alone with picking out the pictures and getting them on the word document. so i changed it and i did the actual computer part, but they told me everything to do. then they had to come up with their number sentence and word sentence and i typed it for them. in the

end, it went really well and the students were able to see another way to represent math problems. they were completely engaged because the computer was involved. i think this was the best use of technology so far this year. i was very happy with the results.

United Streaming:

the other day, my team had picked a short video on united streaming about Martin Luther King. My mentor had shown it to her class and said it was great and the kids really liked it. During my planning time, i downloaded it and got it all ready. Everything was ready to go. Once the kids were in the room, i got it ready to be on the t.v. We started watching the video and everything was going great. all of a sudden, in the middle of the video, it stopped playing and i couldn't get it to start again without starting over. i felt extremely frustrated because the kids were only able to see half of it and it was very informative and they were all listening. sometimes with technology, you just never know what is going to happen. i am feeling a little apprehensive now about united streaming because i would be really mad if that happened again, because it upset the learning process.

Computer Lab and Learning,com:

We go to the computer lab once a week. it was time for us to start using learning.com. i will admit that i was nervous about this endevor because i knew it was going to take a lot of setup. with 21 kids in the computer lab by myself, it is quite difficult to get them all ready to go (ie. getting on the internet; typing in the correct website, etc...) i had prepared cards for them that had their username and password on them, hoping to alleviate some of the stress. Well, once we got there, my nerves had served me right. it was extremely difficult to get them all setup. we have a monitor that puts my computer screen up on a big screen so they can all see it, so i could explain each step. but this was still very difficult for some children. it was also very hard for the kids to find certain letters on the keyboard so i was running around the computer lab like a mad woman trying to get them all on learning.com and get their username and password in there. i was very very very

frustrated. by the time i got them all on the start page, we had used abou 20 minutes of our computer time which was annoying! but i will admit, once they got started there was this overwhelming silence all of a sudden. they were all engaged and starting to learning basic mouse skills and keyboard skills. in the end it was worth it and i hope the getting ready part goes better next week!

FREQUENCY TABLES

Cohort Membership

Cohort	Frequency	Percent
-	9	13.8
b	8	12.3
e	6	9.2
f	1	1.5
g	6	9.2
j	3	4.6
n	4	6.2
o	5	7.7
p	2	3.1
s	7	10.8
t	7	10.8
u	7	10.8
Total	65	100.0

Q4

	Frequency	Percent
1	1	1.5
2	10	15.4
3	5	7.7
4	36	55.4
5	13	20.0
Total	65	100.0

Q5

	Frequency	Percent
2	6	9.4
3	3	4.7
4	47	73.4
5	8	12.5
Total	64	100.0

Q6

	Frequency	Percent
1	3	4.7
2	21	32.8
3	10	15.6
4	26	40.6
5	4	6.3
Total	64	100.0

Q7

	Frequency	Percent
1	5	7.9
2	11	17.5
3	16	25.4
4	27	42.9
5	4	6.3
Total	63	100.0

Q8

	Frequency	Percent
1	3	4.7
2	18	28.1
3	5	7.8
4	32	50.0
5	6	9.4
Total	64	100.0

Q9

	Frequency	Percent
1	6	9.4
2	20	31.3
3	12	18.8
4	22	34.4
5	4	6.3
Total	64	100.0

Q10

	Frequency	Percent
1	6	9.4
2	21	32.8
3	24	37.5
4	13	20.3
Total	64	100.0

Q11

	Frequency	Percent
1	3	4.7
2	5	7.8
3	10	15.6
4	39	60.9
5	7	10.9
Total	64	100.0

Q12

	Frequency	Percent
1	5	8.2
2	8	13.1
3	16	26.2
4	18	29.5
5	14	23.0
Total	61	100.0

Q13

	Frequency	Percent
1	11	18.0
2	16	26.2
3	21	34.4
4	6	9.8
5	7	11.5
Total	61	100.0

Q14

	Frequency	Percent
1	21	35.0
2	25	41.7
3	9	15.0
4	3	5.0
5	2	3.3
Total	60	100.0

Q15

	Frequency	Percent
1	27	45.8
2	18	30.5
3	10	16.9
4	1	1.7
5	3	5.1
Total	59	100.0

Q16

	Frequency	Percent
1	14	23.3
2	13	21.7
3	15	25.0
4	4	6.7
5	14	23.3
Total	60	100.0

Q17

	Frequency	Percent
1	15	25.0
2	18	30.0
3	15	25.0
4	1	1.7
5	11	18.3
Total	60	100.0

Q18

	Frequency	Percent
2	1	1.7
3	1	1.7
4	27	45.0
5	31	51.7
Total	60	100.0

Q19

	Frequency	Percent
1	7	11.7
2	9	15.0
3	15	25.0
4	22	36.7
5	7	11.7
Total	60	100.0

Q20

	Frequency	Percent
1	4	6.7
2	19	31.7
3	8	13.3
4	24	40.0
5	5	8.3
Total	60	100.0

Q21

	Frequency	Percent
1	6	10.2
2	10	16.9
3	4	6.8
4	22	37.3
5	17	28.8
Total	59	100.0

Q22

	Frequency	Percent
1	5	8.5
2	11	18.6
3	10	16.9
4	26	44.1
5	7	11.9
Total	59	100.0

Q23

	Frequency	Percent
1	3	5.2
2	6	10.3
3	8	13.8
4	28	48.3
5	13	22.4
Total	58	100.0

Q24

	Frequency	Percent
1	2	3.4
2	16	27.1
3	17	28.8
4	17	28.8
5	7	11.9
Total	59	100.0

Q25

	Frequency	Percent
1	5	8.5
2	20	33.9
3	15	25.4
4	15	25.4
5	4	6.8
Total	59	100.0

Q26

	Frequency	Percent
1	1	1.7
2	5	8.5
3	16	27.1
4	33	55.9
5	4	6.8
Total	59	100.0

Q27

	Frequency	Percent
2	1	1.7
3	21	35.6
4	29	49.2
5	8	13.6
Total	59	100.0

Q28

	Frequency	Percent
2	4	6.7
3	11	18.3
4	30	50.0
5	15	25.0
Total	60	100.0

	Frequency	Percent
1	1	1.7
2	2	3.4
3	16	27.6
4	29	50.0
5	10	17.2
Total	58	100.0

Q30

	Frequency	Percent
1	2	3.3
2	3	5.0
3	32	53.3
4	16	26.7
5	7	11.7
Total	60	100.0

Q31

	Frequency	Percent
2	2	3.3
3	20	33.3
4	26	43.3
5	12	20.0
Total	60	100.0

Q32

	Frequency	Percent
2	4	6.7
3	24	40.0
4	26	43.3
5	6	10.0
Total	60	100.0

Q33

	Frequency	Percent
2	1	1.7
3	7	12.1
4	31	53.4
5	19	32.8
Total	58	100.0

Q34

	Frequency	Percent
1	2	3.3
2	10	16.7
3	12	20.0
4	27	45.0
5	9	15.0
Total	60	100.0

Q35

	Frequency	Percent
1	1	1.7
2	2	3.3
3	27	45.0
4	23	38.3
5	7	11.7
Total	60	100.0

Q36

	Frequency	Percent
2	2	3.3
3	11	18.3
4	38	63.3
5	9	15.0
Total	60	100.0

Q37

	Frequency	Percent	
	2	8	13.8
	3	24	41.4
	4	22	37.9
	5	4	6.9
	Total	58	100.0

Q38

	Frequency	Percent	
	2	2	3.4
	3	15	25.4
	4	32	54.2
	5	10	16.9
	Total	59	100.0

Q39

	Frequency	Percent	
	1	1	1.7
	2	11	18.6
	3	21	35.6
	4	22	37.3
	5	4	6.8
	Total	59	100.0

Q40

	Frequency	Percent	
	1	3	5.1
	2	56	94.9
	Total	59	100.0

Q41

	Frequency	Percent	
	1	58	98.3
	2	1	1.7
	Total	59	100.0

Q42

	Frequency	Percent	
	1	45	77.6
	2	13	22.4
	Total	58	100.0

Q43

	Frequency	Percent	
	1	56	94.9
	2	3	5.1
	Total	59	100.0

Q45

	Frequency	Percent	
	1	38	64.4
	2	21	35.6
	Total	59	100.0

Q46

Q47	Frequency	Percent	
	1	1	1.8
	2	16	28.1
	3	6	10.5
	4	30	52.6
	5	4	7.0
	Total	57	100.0

Q48	Frequency	Percent	
	1	16	27.6
	2	17	29.3
	3	7	12.1
	4	10	17.2
	5	8	13.8
	Total	58	100.0

Q49

	Frequency	Percent
1	1	1.7
2	5	8.5
3	2	3.4
4	35	59.3
5	16	27.1
Total	59	100.0

Q50

	Frequency	Percent
1	1	1.7
2	6	10.3
3	7	12.1
4	39	67.2
5	5	8.6
Total	58	100.0

Q51

	Frequency	Percent
1	4	6.8
2	15	25.4
3	12	20.3
4	26	44.1
5	2	3.4
Total	59	100.0

Q52

	Frequency	Percent
1	4	6.7
2	7	11.7
3	6	10.0
4	28	46.7
5	15	25.0
Total	60	100.0

Q53

	Frequency	Percent
1	11	18.3
2	16	26.7
3	4	6.7
4	21	35.0
5	8	13.3
Total	60	100.0

Q54

	Frequency	Percent
2	6	10.0
3	17	28.3
4	30	50.0
5	7	11.7
Total	60	100.0

Q55

	Frequency	Percent
1	4	6.7
2	9	15.0
3	16	26.7
4	24	40.0
5	7	11.7
Total	60	100.0

Q56

	Frequency	Percent
1	1	1.7
2	27	45.8
3	10	16.9
4	15	25.4
5	6	10.2
Total	59	100.0

References

Apple, M. (1997). The New Technology: Is it part of the solution or part of the problem? In G. Hawisher & C. Selfe (Eds.), *Literacy, Technology, and Society, Confronting the Issues*(160-176). Upper Saddle River, New Jersey: Prentice Hall.

Atkinson, D. (2004). Theorizing how student teachers form their identities in initial teacher education. *British Educational Research Journal, 30*(3), 379-394.

Barron, A. E., Kemker, K., Harmes, C., & Kalaydjian, K. (2003). Large-Scale Research Study on Technology in K-12 School: Technology Integration as It Relates to the National Technology Standards. *Journal of Research on Technology in Education*, 35(4), 489-497

Becker, H. J. (1994). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Journal of Research on Computing in Education, 26*(3), 291-321.

Borko, H., & Putnam, R. (1996). Learning to Teach. In D. Berliner & R. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 673-708). New York: Simon & Schuster Macmillan.

Brown, D., & Petitto, K. (2003). The Status of Ubiquitous Computing. *Educause Review, 38*(3), 24-31.

Bullough, & Baughman. (1997). "*First -year teacher" eight years later*. New York: Teachers College Press.

Carlsen, W. (1999). Domains of Teacher Knowledge. In Gess-Newsome & Lederman (Eds.), *Examining Pedagogical Content Knowledge* (pp. 133-144). Boston: Kluwer Academic

Carlson, S. (2002, October-December). The Missing Link in Educational Technology: Trained Teachers. *TechKnowLogia*, 5. Retrieved August 12, 2005, from http://www.TechKnowLogia.org

Center for Applied Special Technology. (1996). *The Role of Online Communications in Schools: A National Study*. Peabody, MA: Author.

CEO. (2000, February). CEO Forum challenges teacher preparation institutions. In *Heller report on educational technology markets* (Vol. 11 (4), p. 3). Skokie, IL: Nelson B. Heller and Associates.

Cuban, L. (1998, February 5). *The Pros and Cons of Technology in the Classroom*. Paper presented at the Bay Area School Reform Collaborative Funders' Learning Community Meeting. Retrieved Feb 20, 2005, from http://tappedin.org/archive/peacuban/index.html

Darling-Hammond, L. (1998). Teacher learning that supports student learning. *Educational Leadership, 55*(5), 6-11.

Darling-Hammond, L., & Berry, B. (1999). Recruiting teachers for the 21st century: The foundation for educational equity. *The Journal of Negro Education, 68*(3), 254-279.

Darling-Hammond, L., Chung, R., & Frelow, F. (2002). Variation in teacher preparation - How well do different pathways prepare teachers to teach? *Journal of Teacher Education, 53*(4), 286-302.

Dexter, S., & Riedel, E. (2003). Why improving pre-service teacher educational technology preparation must go beyond the college's walls. *Journal of Teacher Education, 54*(1), 334.

Duhon, P. (1999). *Preparing New teachers to Use technology: A comparative study of pre-service teacher education programs*. Unpublished dissertation, Louisiana State University, Louisiana.

eSchoolnews. (2005, July 11). *Mich. laptop program shows early success*. Retrieved August 12, 2005 from http://www.eschoolnews.com

eSchoolnews. (2005, July 12). *Textbooks give way to digital curriculum.* Retrieved July 13, 2005, from http://www.eschoolnews.com/news/showstoryts.cfm?ArticleID=5781&page=1

Fitzsimons, P. (2000). Changing Conceptions of Globalization: Changing Conceptions of Education. *Educational Theory, 50*(4), 505-521.

Friedman, E. A. (2002). A Comprehensive Strategy for Internet-in-Education Teacher Professional Development. *International Journal of Technologies for the Advancement of Knowledge and Learning, 4*(4), 66-69.

Fullan, M. (1993). The Complexity of the Change Process. In C. 3 (Ed.), *Change forces: Probing the depths of educational reform*. Bristol, PA: Falmer Press.

Fuller, D. E. (2003). Comparrison of TxBESS and Non-TxBESS Beginning Teacher Retention Rates from AY00-01 to AY 01-02 by Region Education Service. Austin, TX: SBEC.

Fuller, F., & Bown, O. (1988). Becoming a teacher. In *Yearbook of the National Society for the Study of Education* (pp. 25-52).

Gall, M., Gall, J., & Borg, W. (2003). *Educational Research, An Introduction* (7th ed.). Boston: Allyn and Bacon.

Gess-Newsome. (1999). Pedagogical Content Knowledge: An Introduction and Orientation. In Gess-Newsome & Lederman (Eds.), *Examining Pedagogical Content Knowledge* (pp. 3-17). Boston: Kluwer Academic Publishers.

Goldfarb, B. (2002). *Visual Pedagogy*. Durham: Duke University Press.

Granger, C. A., Morbey, M. L., Lotherington, H., Owston, R. D., & Wideman, H. H. (2002). Factors contributing to teachers' successful implementation of IT. . *Journal of Computer Assisted Learning 18*(4), 480-488.

Greaves, T. (2000). One-to-One Computing Tools for Life. *T H E Journal, 27*(10), 54-56.

Greene, J., Caracelli, V., & Graham, W. (1989). Toward a Conceptual Framework for Mixed-Method Evaluation Designs. *Educational Evaluation and Policy Analysis, 11*(3), 255-274.

Grossman, P. L. (1989). A Study in Contrast - Sources of Pedagogical Content Knowledge for Secondary English. *Journal of Teacher Education, 40*(5), 24-31.

Grossman, P. L. (1990). *Making of a Teacher: Teacher Knowledge & Teacher Education*. New York: Teacher's College Press.

Gustafson, B., Guilbert, S., & MacDonald, D. (2002). Beginning elementary science teachers: Developing professional knowledge during a limited mentoring experience. *Research in Science Education, 32*(3), 281-302.

Haddad, W. (2003). Is Instructional Technology a Must for Learning? *International Journal of Technologies for the Advancement of Knowledge and Learning, 5*(1), 5-6.

Hall, G., & Hord, S. (2001). *Implementing Change, Patterns, Principles and Potholes*. Boston: Allyn and Bacon.

Halpin, R. (1999). A Model of Constructivist learning in Practice: Computer Literacy Integrated into Elementary Mathematics and Science Teacher Education. *Journal of Research on Computing in Education, 32*(1), 128-138.

Hargrave, C., & Hsus, Y.-S. (2000). Survey of Instructional technology Courses for Preservice Teachers. *Journal of Technology and Teacher Education, 8*(4), 303.

Holloway, J. (2001). The Benefits of Mentoring. *Educational Leadership*, *58* (8), 85-86.

Ingersoll, R., & Jeffrey, K. (2004). *The Impact of Mentoring on Teacher Retention: What the Research Says*. Denver: Educational Commission of the States.

Initiative, M. L. T. (2005). Maine Learning Technology Initiative. Retrieved June 20, 2005, from http://www.state.me.us/mlte/

ISTE. (2000). *ISTE NETS Essential Conditions for Teacher Preparation*, *PDF*. Retrieved January 30, 2005 from http://www.iste.org.

ISTE. (2004a). Essential Conditions for Teacher Preparation. Retrieved Jan 30, 2005, from http://cnets.iste.org/teachers/t_esscond.html

ISTE. (2004b). *National Educational Technology Standards (NETS) and the States*. In U. o. N. b. State (Ed.). Retrieved June 20, 2005, from http://cnets.iste.org/index.shtml

ISTE. (2005). National Educational Technology Standards Projects. Retrieved June 20, 2005, from http://cnets.iste.org/index.shtml

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher, 33*(7), 14-26.

Kleiner, A., & Farris, E. (2002). *Internet Access in US Public Schools and Classrooms:1994-2001*. Washington D.C.: Bureau of Census.

Lee, E., Brown, M., Puthoff, E., Fletcher, S., & Luft, J. (2005). *Capturing Pedagogical Content Knowledge of Beginning Secondary Science Teachers: Year 1*. Unpublished manuscript, University of Texas at Austin.

Lemon Grove School District. (2004). Raising Student Achievement by Closing the Digital Divide. *About Project LemonLink*. Retrieved July 5, 2005, from http://www.lgsd.k12.ca.us/lemonlink/About.htm

Levin, B. (2003). *Case Studies of Teacher Development An In-Depth Look at How Thinking About Pedagogy Develops Over Time*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Luft, J. A., Roehrig, G. H., & Patterson, N. C. (2003). Contrasting landscapes: A comparison of the impact of different induction programs on beginning secondary science teachers' practices, beliefs, and experiences. *Journal of Research in Science Teaching, 40*(1), 77-97.

Margerum-Leys, J., & Marx, R. W. (2004). The nature and sharing of teacher knowledge of technology in a student teacher/mentor teacher pair. *Journal of Teacher Education, 55*(5), 421-437.

McCormick, R., & Scrimshaw, P. (2001). Information and Communications Technology, Knowledge and Pedagogy. . *Education, Communication and Information, 1*(1), 37-57

McCurry, D. (2000). Multimedia Knowledge and Culture Production: On the Possibility of a Critical and Ethical Pedagogy Resulting From the Current Push for Technology in the Classroom. *Bulletin of Science, Technology and Society, 20*(2), 100-105.

McGinnis, J. R., Parker, C., & Graeber, A. O. (2004). A cultural perspective of the induction of five reform-minded beginning mathematics and science teachers. *Journal of Research in Science Teaching, 41*(7), 720-747.

MDR. (2003). *Computers for Student Instruction in Elementary and Secondary Schools: 2002-2003*. Shelton, CT: Market Data Retrieval. Retrieved July 20, 2005 from LEXUS database.

Merriam, S. B. (1998). *Qualititative research and Case Study Applications in Education.* San Fransisco: Josey-Bass Publishers.

Mich. laptop program shows early success. (2005, August). *eSchool News, 8.*

Munby, H., Russell, T., & Martin, A. (2001). Teachers' Knowledge and How It Develops. In V. Richardson (Ed.), *Handbook of Research on Teaching* (pp. 877-904). Washington D.C: AERA.

NCES. (2001). Percent of Public Schools with Internet Access by School Characteristics: 1994-2001. In *S.o.A.T.i.P Schools* (Ed.)*, Internet Access in U.S. Public Schools and Classrooms: 1994-2001.Washington, DC*: U.S. Department of Education, Office of Educational Research and Improvement.

Niess, M. (2001). A Model for Integrating Technology in Preservice Science and Mathematics Content-Specific Teacher Preparation. *School Science and Mathematics, 101*(2), 102.

Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education, 21*(5), 509-523.

Noeth, R., & Volkov, B. (2004). Evaluating the Effectiveness of Technology in our Schools in *ACT Policy Report*. Iowa City, IA: ACT.

Novak, D. I., & Berger, C. F. (1991). Integrating technology into teacher education. *T H E Journal (Technological Horizons In Education), 18*(9), 83.

NTIA. (2002). *A Nation Online: How Americans are Expanding their Use of the Internet*. Washington, D.C.: U.S. Department of Commerce.

OECD. (2001). *Learning to Change: ICT in Schools*. Paris: OECD.

OERI. (1998). Table 427. Student use of computers, by level of instruction and selected characteristics: 1984 to 1997. In C. P. Survey (Ed.). Washington D.C.: Bureau of the Census.

OET. (2004). *Toward a New Golden Age in American Education, How the Internet, the Law and Today's Students are Revolutionizing Expectations*. Washington, D.C.: U.S. Department of Education, Office of Educational Technology.

Oliver. (1994). Information Technology Courses in Teacher Education: The Need for Integration. *Journal of Information Technology for Teacher Education, 3*(2), 135.

OTA. (1995). *Teachers and Technology: Making the Connection* (OTA-EHR-616). Washington, DC: U.S. Congress, Office of Technology Assessment.

Parsad, B., & Jones, J. (2005). *Internet Access in U.S. Public Schools and Classrooms: 1994–2003* (No. NCES 2005-015). Washington, DC: U.S. Department of Education.

Peck, C., Cuban, L., & Kirkpatrick, H. (2002a). High-Tech's High Hopes Meet Student Realities. *Phi Delta Kappan, 67*(8), 47.

Peck, C., Cuban, L., & Kirkpatrick, H. (2002b). Techno-Promoter Dreams, Student Realities. *Phi Delta Kappan, 83*(6), 472.

Pelgrum. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers & Education, 37*, 163-178.

Pelgrum, & Plomp. (1993). The Worldwide Use of Computers: A description of main trends. *Computers in education, 20*(4), 323-332.

PT3. (2002). PT3 Grant Management- Reporting- Required Performance Reporting. Retrieved July 5, 2005, from http://www.pt3.org/grantmanagement/reporting/gpra.html

PT3. (2005). Preparing Tomorrow's Teachers to Use Technology Program (PT3). Retrieved June 20, 2005, from http://www.ed.gov/programs/teachtech/index.html

Richardson, V., & Placier, P. (2001). Teacher Change. In V. Richardson (Ed.), *Handbook of Research on Teachers* (pp. 905-947). Washington D.C.: AERA.

Rossman, G., & Rallis, S. (2003). *Learning in the Field: An Introduction to Qualitative Research*. Thousand Oakes: Sage Publications.

Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: implications for preservice and inservice teacher preparation. *Journal of Teacher Education, 54*(1), 297.

Savenye, W. C., Davidson, G., & Orr, K. (1992). Effects of an Educational Computing Course on Preservice Teachers' Attitudes and Anxiety Towards Computers. *Journal of Computing in Childhood Education, 3*, 31-41.

Schallert, & Martin. (2003). A Psychological analysis of What teachers Do in the Language Arts Classroom. In Flood, Lapps, Squire & Jensen (Eds.), *Handbook of Research on Teaching the English Language Arts* (pp. 31-45). Mahweh, NJ: Erlbaum.

Segall, A. (2004). Revisiting pedagogical content knowledge: the pedagogy of content/the content of pedagogy. *Teaching and Teacher Education, 20*(5), 489-504.

Shulman. (1987). Knowledge and Teaching - Foundations of the New Reform. *57*(1), 1-22.

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher, 15*(2), 4-14.

Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Reseach Journal, 41*(3), 681-714.

Snider, S. (2003). Exploring Technology Integration in a Field-Based Teacher Education Program: Implementation Efforts and Findings. *Journal of Research on Technology in Education, 34*(3), 230-249.

Stake, R. (1995). *The Art of Case Study Research*. Thousand Oakes: Sage Publications.

Stites, S. (2005, June 30). School district's laptop implementation goal shifts. *The De Soto Explorer Online*. Retrieved July 20, 2005 from http://www.desotoexplorer.com/section/news/story/4362

Stockard, J., & Lehman, M. B. (2004). Influences on the Satisfaction and Retention of 1st-Year Teachers: The Importance of Effective School Management. *Educational Administration Quarterly, 40*(5), 742-771.

Strudler, N. (1996). The Role of School-based Technology Coordinators as Change Agents in Elementary School Programs: A Follow-up Study. *Journal of Research on Computing in Education, 28*(2), 234-257.

Swain, C. (2006). Preservice Teachers Self-Assesment Using Technology: Determining What is Worthwhile and Looking for Changes in Daily Teaching and Learning Practices. *Journal of Teaching and Teacher Education, 14*(1), 29-59.

Tashakkori, A., & Teddlie, C. (1998). *Mixed Methodology* (Vol. 46). Thousand Oakes: Sage Publications.

Thomas, R. M. (2003). *Blending Qualitative and Quantitative research Methods in Theses and Dissertations*. Thousand Oakes, CA: Corwin Press, Inc.

Topp, N. (1996). Preparation to Use Technology in the Classroom:Opinions by Recent Graduates. *Journal of Computing in Teacher Education, 12*(4), 24-27.

Topp, N. W. (1995). Building a Technology-Using Faculty to Facilitate Technology-Using Teachers. *Journal of Computing in Teacher Education, 11*(3), 11-14.

TxTIP. (2005). The Technology Immersion Pilot Project. Retrieved June 20, 2005, from http://www.txtip.info/pages/1/index.htm

U.S. Department of Education, O. o. E. T. (2004). *Toward a New Golden Age in American Education, How the Internet, the Law and Today's Students are Revolutionizing Expectations*. Washington, D.C.: U.S. Department of Education.

UT_CoE. (2005). Laptop Initiative for Future Educators. Retrieved May 29, 2005, from http://www.utexas.edu/education/laptop.html

Van Driel, J. H., Beijaard, D., & Verloop, N. (2001). Professional development and reform in science education: The role of teachers' practical knowledge. *Journal of Research in Science Teaching, 38*(2), 137-158.

Vannatta, R. A., & Fordham, N. (2004). Teacher Dispositions as Predictors of Classroom Technology Use. *Journal of Research on Technology in Education, 36*(3), 253-273.

Veenman, S. (1984). Perceived Problems of Beginning Teachers. *Review of Educational Research, 54*(2), 143-178.

Watts-Taffe, S., Gwinn, C. B., Johnson, J. R., & Horn, M. L. (2003). Preparing Preservice Teachers to Integrate Technology with the Elementary Literacy Program. *The Reading Teacher, 57*(2), 9.

Wetzel, K. (1993). Models for Acheiving Computer Competencies in Preservice Education. *Journal of Computing in teacher Education, 9*(4), 4.

Wiebe. (1995). The Need to Teach People About Computers. *Journal of Computing in Teacher Education, 11*(3), 2.

Willis, J. (1993). What conditions encourage technology use? It depends on the context. *Computers in the Schools, 9*(4), 13-32.

Wong, H. K., Britton, T., & Ganser, T. (2005). What the world can teach us about new teacher induction. *Phi Delta Kappan, 86*(5), 379-384.

Yin, R. (2005). Appendix: Doing Case Studies in Education. In R. Yin (Ed.), *Introducing the World of Education*. (pp. 379-394). Thousand Oaks, CA: Sage Publications.

Yin, R. (2003). *Case Study Research: Design and Methods* (Vol. 5). Thousand Oakes: Sage Publications.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for Classroom Technology Innovations. *Teachers College Record, 104*(3), 482-515.

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